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ABSTRACT

This report is part of a study of academic performance by American Indian elementary school students with limited-English proficiency (LEP). The study was designed to complement the National Longitudinal Evaluation of the Effectiveness of Services for Language Minority Limited-English-Proficient (LM-LEP) Students, which did not include Native American students. The document summarizes results of the first year of a two-year study. It includes results of data collection from 23 projects, with students from 16 different tribes and 18 different language groups. The document describes American Indian bilingual education projects, their criteria, and the instruction generally received by Indian LEP elementary students. The Stanford Achievement Test (SAT) was used as a measure of academic achievement of first- and third-grade American Indian LEP students. The students scored somewhat higher on vocabulary and reading comprehension than students in the national LM-LEP study, but slightly lower in math. It is noted that students receiving special instruction in English were most likely to have low SAT scores, suggesting the special services are being directed toward those who are most in need of them. The report contends Indian students in rural schools have serious educational problems. Although the students have average or better than-average academic aptitudes, they performed poorly on standardized achievement tests. A comprehensive assessment of the schools the students attend is recommended. Graphs, charts and references are included. (Author/TES)

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INSTRUCTIONAL SERVICES FOR NATIVE AMERICAN STUDENTS WITH LIMITED-ENGLISH-PROFICIENCY

YEAR ONE REPORT
OF THE
NATIONAL EVALUATION OF SERVICES FOR LIMITED-ENGLISH-PROFICIENT NATIVE AMERICAN STUDENTS

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PREFACE

This report describes the instructional services provided to limited-English-proficient Native American students and the characteristics of these students. It summarizes the results of the first year of a two-year study. Included are the results of document reviews and telephone contacts with 56 of the 58 Title VII projects serving elementary-grade level Native American students during the 1985-86 school year and of extensive on-site data collection in a sample of 23 of these projects. The data collection and analyses were performed by Development Associates, Inc., in affiliation with the Research Triangle Institute, during the years 1985-1987.

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We also thank the numerous local school principals, teachers, and other administrative personnel who were so cooperative in all aspects of the study. The burden on Title VII directors and some teachers and administrators was substantial, and the study could not have been completed without their cooperation. The quality of program evaluation ultimately rests on its data, and local school personnel were uniformly willing to help the study achieve its goals. This cooperation is greatly appreciated.

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EXECUTIVE SUMMARY

Instructional Services for Native American Students with Limited-English-Proficiency

A. BACKGROUND

In September of 1985, Development Associates, Inc., was awarded a contract to provide the U.S. Department of Education with an analytic description of instructional services provided to limited-English-proficient (LEP) Native American students in elementary school grades and a description of the students receiving these services. The study was a complement to the "National Longitudinal Evaluation of the Effectiveness of Services for Language-Minority Limited-English-Proficient Students," which was also being conducted for the Department of Education but which did not contain a sample of Native American students.

To obtain a sizeable population of Native American LEP students, it was decided to focus the study on schools participating in Title VII (bilingual education) projects for Native American students. A total of 58 Title VII projects serving elementary-grade-level Native American students were identified through a review of applications and grant award documents in the files of the Office of Bilingual Education and Minority Languages Affairs (OBEMLA) in the U.S. Department of Education. Complete descriptive data were obtained on 56 of these 58 projects (97%), and 23 of the 56 projects were visited for intensive student-level data collection.

All but four of the 56 projects were located in extremely remote, poor rural areas of the country, on or near Indian reservations, and all 23 of the visited projects were in such areas. (The four exceptions were all urban projects, serving diverse Indian populations.) In addition, most projects were relatively small, receiving an average Title VII grant for 19[illegible] $134,840 (range: $15,713-$320,352) and serving an average of 201 Indian students in grades K-6 (range: 12 students - 734 students).

The Native American LEP students in schools served by the 56 projects came from over 25 different Native American language backgrounds. In the 23 visited projects, the Indian students were from 18 different language groups and 16 different tribes. It is important to note that these are 18 different languages, not dialects. For the most part, these languages differ from one another more than do English and Russian, the differences among them being more comparable to those between English and Japanese or English and Swahili. Similarly, the cultures of the 16 tribal groups are, for the most part, as alien to one another as they are to mainstream American culture.

Such diversity makes it extremely difficult to draw valid generalizations across all schools serving Native American students. This diversity is only compounded by the fact that in many of the communities served by Title VII projects (e.g., communities on the Crow and Navajo reservations), the Indian language is used more than English while in others English is used more than the Indian language.

B. FINDINGS

1. TITLE VII PROJECT INSTRUCTIONAL GOALS AND SERVICES PROVIDED

Nearly all (96%) Title VII projects serving Native American students stated that the improvement of Indian LEP students' English language proficiency was a primary goal. About half (54%) also reported that the maintenance or improvement of the students' native language was a goal. For all of the 23 projects selected for site visits, improvement of students' English-language proficiency was a primary goal, and 12 (52%) had maintenance or improvement of an Indian language as a goal as well.

Most often, project funds were used to provide the services of instructional aides and to develop instructional materials. Typically the instructional aides were American Indians who were bilingual or had received special training in teaching English as a second language. Projects averaged about five full-time and three part-time staff, including the project director and support personnel. The majority of these staff were aides or tutors.

2. THE INSTRUCTION PROVIDED TO INDIAN LEP STUDENTS

Data gathered during the site visits to the 23 projects reveal that the goal of improving students' English language proficiency was reflected in the classroom instruction. At both the first and third grades, the most common pattern of instruction was for Indian students to receive a relatively large amount of their instruction in English, for there to be only a moderate use of the native language in providing instruction, and for there to be very little instruction in native language arts. There were no project schools in either the first or third grade in which all or most of the instruction provided to Indian students was in the native language, and students in schools in communities where an Indian language was predominant received significantly more instruction in their Indian language than did students elsewhere.

The data on the number of hours per week of instruction in academic subjects for Indian students are shown in Table 1. To put these data into perspective, the table also shows data from a recent national survey of instruction to non-Indian LEP students.[1] There are important differences between the two groups. Both first and third grade Indian students received:

- significantly more regular instruction in English (reading as well as other English language arts) than did LEP students in general (more than twice as much in first grade);
- roughly the same amount of special instruction in English; and
- substantially less instruction in native language reading and other native language arts.

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[1] Young, M.B. et al. (1986). Instructing children with limited English ability. Year One Report of the National Longitudinal Evaluation of the Effectiveness of Services for Language-Minority Limited-English-Proficient Students. Washington, D.C.: Office of Program, Budget, and Evaluation, U.S. Department of Education.

TABLE 1. Comparison of average hours of instruction per week for Indian students with hours for LM-LEP students nationally

	Average Hours of Instruction			
	Indian		LM-LEP*	
Subject	Grade 1	Grade 3	Grade 1	Grade 3
English Reading and Other Language Arts	9.8	8.0	4.7	6.8
Special English Reading and Other Language Arts	3.0	2.9	2.9	3.3
Native Language Reading and Other Language Arts	1.3	0.9	5.6	3.7
Mathematics	4.0	4.7	4.3	4.5
Social Studies	1.5	2.4	1.8	1.9
Science	1.7	2.3	0.4	1.8
Ethnic Heritage	0.6	0.9	0.4	0.4
TOTAL	21.9	22.1	22.3	22.4

**Data summarized from Young et al. (1986), Table 6.3

While Indian LEP students received an average of 12.8 hours per week of instruction in English in first grade and 10.9 hours in third grade, LEP students nationwide received an average of 7.6 hours in first grade and 10.1 in third grade.

Regarding the teaching of Indian languages, no instruction at all was provided in a quarter of the project schools, and in over half of the remaining schools students received less than three hours of instruction a week. In four schools, students received over 5.0 hours of instruction in Indian language arts each week, and in one very small school third graders received almost 16 hours of such instruction each week. Overall, however, Indian LEP students received an average of only 1.3 hours per week of Indian language arts instruction in first grade and 0.9 hours of such instruction in third grade, while LEP students nationally received an average of 5.6 hours of instruction in native language arts in first grade and 3.7 hours of such instruction in third grade.

As for other subject areas, the data show that Indian LEP students and LEP students nationwide receive roughly the same amount of instruction in mathematics, social studies, science, and ethnic heritage.

Consistent with the emphasis on English language instruction, only about 11% of the main teachers of first-graders and 17% of third-grade teachers reported using any Indian language materials. When asked the extent to which these classroom materials were relevant to their Indian students' cultural experience, over a quarter indicated that none of their materials was relevant and over 50% more indicated some, but less than half, of their materials were relevant to the cultural experience of their students. Also of note is the finding that although virtually all of the main teachers of the students in the study possessed state teaching certification, less than 5% of the main teachers and 10% of the auxiliary teachers were certified in either bilingual education or ESL. In addition, less than half of the main teachers and less than a third of other personnel reported receiving any inservice or preservice training related to the instruction of LEP students within the past three years.

3. INDIAN STUDENT ELIGIBILITY FOR TITLE VII SERVICES

Of the elementary grade-level students in the schools served by the 56 Title VII projects for Native Americans, an average of 63% of the Indian children were classified as being limited-English-proficient by local criteria. Most of the projects (87%) indicated that a home language survey was the first step in determining student eligibility for Title VII services. The same percentage (87%) stated that scores on a test of English language oral proficiency were used as an entry criterion. In addition, 76% of the projects used the results from a test of students' literacy in English, 44% used findings from a test of students' oral proficiency in an Indian language, and 27% used the results from a test of students' literacy in the Indian language. Most projects (89%) also considered teacher or other staff judgments as a factor.

Once identified as LEP, students in those schools with a formal assessment process always were reassessed at least once each year. In almost half of these schools (48%) students were reassessed at least twice a year, usually in the spring and fall.

5. THE ACADEMIC ACHIEVEMENT OF INDIAN LEP STUDENTS

To obtain a measure of the academic achievement of the Indian students at the visited schools, selected English and mathematics subtests of the Stanford Achievement Test (SAT) were administered to the first and third grade students. A comparison of the SAT scores of the Indian students with national norms reveals that the Indian students systematically scored substantially below the national norms (see Table 2). A comparison of the SAT scores for these students with the same data on students in the national LM-LEP Study reveals that the Indian students score somewhat higher on vocabulary and reading comprehension than the LM-LEP students, but slightly lower in math.[1] The Indian students score substantially lower than the English-proficient students in the LM-LEP Study on all SAT tests.

The consistently low means of the Indian students are probably due in part to the limited English proficiency of the students. All of the students in the study attended schools in isolated rural areas and the English-language proficiency of even many of the monolingual English speakers was quite low.

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[1] Young *et al.*, *Instructing children with limited English ability*, *op cit.*, 1986.

Table 2. Stanford Achievement Test Scores and Percentiles in English and Math for Indian Students

Subtest	Grade 1 Score	Grade 1 %ile	Grade 3 Score	Grade 3 %ile
English Vocabulary	19.0	25	16.1	21
English Reading Comprehension	22.0	27	28.9	25
Concepts of Number	19.7	21	18.0	31
Math Total*	46.0	23	57.4	26

*Math Total is composed of Concept of Numbers, Computation, and Applications subtests.

Furthermore, there is a strong relationship between the extent to which English, rather than an Indian language, is used in the students' communities and the general level of the SAT test scores; the greater the use of the Indian language, the lower the SAT test scores of the students. Students in the three types of communities are about equivalent in academic aptitude, as measured by the Raven Test of Progressive Matrices, yet there are sizable differences among groups on all the Stanford Achievement Test variables. There is also a relationship between test scores and the measure of English language proficiency; the data show that the higher the students' oral proficiency in English, the higher the mean score on the achievement test. However, the mean scores of even the most English-proficient students in both grade levels were well below the 50th percentile in terms of national norms.

With respect to the relation between instructional variables and the SAT scores, there are substantial negative correlations between SAT scores and such variables as hours per week of special instruction in English, percentage of use of simplified English, and percentage of use of an Indian language in instruction. In other words, students receiving these various forms of assistance are the ones who are most likely to have low scores on the SAT. Thus, it appears that the special services designed to help Indian LEP students are being directed to those students who are most in need of such help.

The data from the current study strongly suggest that Indian students in rural schools on or near reservations have serious educational problems. The data show that although these students have academic aptitudes in the average range or slightly above, they perform very poorly on standardized achievement tests. While it was beyond the scope of this study to perform a comprehensive assessment of the schools these students attend, it would seem an appropriate undertaking.

Chapter 1. INTRODUCTION AND BACKGROUND

This report is focused on the nature of the instructional services provided to limited-English-proficient (LEP) Native American students in the elementary grades. The purpose of the report is to provide an analytic description of these instructional services and the characteristics of the students being served. To obtain a sizeable population of Native American LEP students, the study focused on schools participating in Title VII (bilingual education) projects for Native American students. To appreciate the context of the study, it is necessary to understand certain elements of the history of Indian education in the United States and the place of Title VII services within the overall picture of Indian education.

1A A. RECENT EVENTS IN THE HISTORY OF INDIAN EDUCATION

Probably the single most important element in the "revolution" in Indian education which took place in the 1970's was the release in 1969 of two reports, entitled The Education of American Indians and Indian Education: A National Tragedy - A National Challenge (the latter more commonly referred to as "The Kennedy Report"), by the Special Subcommittee on Indian Education of the Committee on Labor and Public Welfare of the U.S. Senate. Although other reports critical of federal administration of Indian education had appeared earlier (e.g., Coleman et al. 1966, Meriam 1928 [1971]), none had so thoroughly and persuasively documented the problems facing Indian children in obtaining an education.

In the years following the release of these reports, numerous changes were made in federal legislation and policy with an aim toward improving Indian education overall. These included the enactment of laws such as the

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[1] Abbreviations and other special terms used in this study are defined in the glossary in Appendix B.

"Indian Education Act" (Title IV of P.L. 92-318) in 1974 and the "Indian Self-Determination and Educational Assistance Act" (P.L. 93-638) in 1975 as well as the amendment of existing laws such as "The Johnson O'Malley Act" of 1934. However, probably more important in the long run than the new amendments and laws were the changes which were wrought in the Indian community by the new policies emanating from Washington. For the first time since the federal government assumed responsibility for educating Indian children in 1865-70, Indian parents found that they could exercise an element of control over the education which their children received.

1B B. ESEA TITLE VII AND ITS ROLE IN THE EDUCATION OF NATIVE AMERICAN STUDENTS

ESEA Title VII was enacted into law in 1968, primarily at the urging of leaders in the Hispanic community. Originally designed to help local school districts develop programs of language-related services to improve the education of limited-English-proficient students by funding demonstration projects, Title VII rapidly grew into a major funding source for the general operation of such programs. It also became a major tool for districts to use in complying with the 1974 decision by the Supreme Court in Lau v. Nichols (414 U.S. 563) which stated that school districts are required, under Title VI of the "Civil Rights Act of 1964," to provide limited-English-proficient students with instructional services designed to overcome their English-language deficiency. In the early years of Title VII, few projects serving Indian students were funded. However, since 1974 -- the year of the Lau decision and the year of the passage of "The Indian Education Act" -- the number of projects funded by Title VII to serve Indian students has increased significantly.

Limited English proficiency has long been noted as a problem for Indian students. For example, in 1969 in "The Kennedy Report," the Bureau of Indian Affairs contended that one-half to two-thirds of Indian children entered school with little or no skill in the English language. Similarly, William Kelley (1967, p. 11) in his study of Indian children in New Mexico and Arizona pointed out that of the 56,000 Indian children in his study, "not one in a hundred starts school with a knowledge of English." And, in surveying the history of Indian education, Lehman L. Brightman (1974, p. 103), concluded that, "unfamiliarity with English is beyond a doubt one of the biggest handicaps Indian students face in the classroom." However, the eligibility of these students for Title VII services has not always been clear.

As originally worded, ESEA Title VII funding was targeted to serve students who were limited-English-proficient because they came from an environment where the dominant language was a language other than English. As will be discussed in Chapter 3, many of the Indian students who are considered by local school districts to be limited-English-proficient come from environments where, although an Indian language is spoken, it is not the dominant language in the community. Thus, only a portion of the limited-English-proficient Indian population was eligible under the 1968 definition.

Dissatisfaction from various quarters with the 1968 definition of eligible participants led to the expansion of the target population in the "Educational Amendments of 1974," to include children who were limited-English-proficient either because they were foreign-born, had a native language other than English, or came from an environment where the dominant language is other than English. Since there were many Indian students whose native language was other than English even though the dominant language in the community was English, the number of Indian students eligible for Title VII services increased under this revised definition.

As part of the "Educational Amendments of 1978," the definition of the target population for Title VII was again revised, this time at the behest of Native American groups. The revised definition reads as follows:

> "(1) The term 'Limited English proficiency' when used with reference to individuals means --
>
> "(A) individuals who were not born in the United States or whose native language is a language other than English,

> "(B) individuals who come from environments where a language other than English is dominant, as further defined by the Commissioner by regulation, and
>
> "(C) individuals who are American Indian and Alaskan Native students and who come from environments where a language other than English has had a significant impact on their level of English language proficiency, subject to such regulations as the Commissioner determines to be necessary;
>
> and, by reason thereof, have sufficient difficulty speaking, reading, writing, or understanding the English language to deny such individuals the opportunity to learn successfully in classrooms where the language of instruction is English."

1C C. OVERVIEW OF STUDY PURPOSE AND DESIGN

The motivation for conducting this study grew, in large part, out of the work being carried out by Development Associates for the "National Longitudinal Evaluation of the Effectiveness of Services for Language-Minority Limited-English-Proficient Students" (hereafter referred to as the LM-LEP Study). The sample of 12,000 students participating in that study was selected to be nationally representative, and thus consisted of large numbers of Hispanic, Chinese, and Southeast Asian students but only a small number of Native American students. Because of the special interest and responsibilities of the federal government vis-a-vis instructional services for Native American students, the U.S. Department of Education determined that a separate study, replicating the instruments and procedures of the study described above, should be carried out with a sample of Native American students.

The primary objective of the first part of this study was to describe the instructional services provided to limited-English-proficient Native American students in the elementary grades. The primary objective of the second part of the study was to acquire an understanding of the degree to which these instructional services are effective in assisting Indian students to function effectively in school. This report focuses solely on the findings from the first part of the study.

The basic research plan for this study called for data to be collected on two cohorts of students in a national sample of schools served by Title VII projects.[1] The first cohort consists of students who were in grade 1 during the 1985-86 school year. The second cohort consists of students who were in grade 3 that year. Based on a review of Title VII grant applications at the Office of Bilingual Education and Minority Languages Affairs (OBEMLA) and telephone and mail contacts with all 58 Title VII projects identified as serving primarily Native American students, 23 projects were selected for on-site data collection.[2] These 23 projects included 32 schools and served a total of 1,588 first and third grade Native American students who came from 16 different tribal groups, and from 18 different native language backgrounds.

During the spring of 1985-86, two visits were made to most of the projects (only one visit was made to some very small projects). The purpose of the first visit, in March of 1986, was to familiarize Title VII project staff, school principals, and other school staff members with the study, to compile rosters of the students to be included in the study, to identify the teachers and support staff members who work with these students, and, where required, to send home parent permission forms. Also during that visit, the study's measure of academic aptitude (the Raven Progressive Matrices) was administered to students in the sample. All of the remaining study instruments (see Appendix C for a description of each) were administered during the second visits in April-June, 1986.

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[1] The school sample for this study was selected from among those schools which had ongoing Title VII projects serving primarily Native American students. This was done in order to facilitate the identification of schools with large numbers of limited-English-proficient Native American students. However, while all of the schools in the study had Title VII-funded projects, not all of the students in the study's student sample received Title VII services. Rather, all limited-English-proficient Native American students in these schools were included, regardless of the instructional services they were receiving.

[2] The contacts with all projects were for the purpose of identifying the sample of projects to be visited. Because of the high cost of data collection in Alaska, the decision was made by the U.S. Department of Education to exclude projects in Alaska from the on-site data collection for this study. Also, although two California projects were also selected for on-site data collection, an initial review of data obtained from the file review and telephone contacts indicated that these projects were very different from those found elsewhere in that they served relatively small numbers of Native American students scattered among a relatively large number of schools. Therefore the decision was made to use a case-study approach in describing these projects (see the description of each in Appendix A).

1D D. ORGANIZATION OF THIS REPORT

Chapter 2 of this report describes the characteristics of the Title VII-funded projects serving Native American elementary school students in the 1985-86 school year, and Chapter 3 reviews the institutional and geographic context of these projects. Chapters 4 and 5 focus on the instruction provided to the students and on the characteristics of the Native American students in project schools.

Following these chapters are eight appendices. Appendix A provides case studies of two Title VII-funded projects serving Native American students in California. Appendix B provides a glossary of the special terms and mathematical symbols used in this report. In Appendix C, the study design and instrumentation are described. Appendix D gives a description of selected composite scores and other variables used in data analysis. Appendix E provides technical information on the study's measure of academic aptitude, the Raven Progressive Matrices Test. Appendix F gives similar information for the study's measure of academic achievement, the Stanford Achievement Test, and Appendix G presents miscellaneous supplementary tables, some of which are ancillary to tables in the text. Finally, in Appendix H we provide the names and institutional affiliations of the study's technical advisors.

Chapter 2. TITLE VII PROJECTS AND THE INSTRUCTION PROVIDED TO INDIAN STUDENTS[1]

This chapter describes the basic characteristics of Title VII projects serving elementary-grade-level Native American students. Following a brief summary of the more salient findings, the chapter provides details regarding the projects' size and duration, goals and objectives, major services, policies, and practices relating to eligibility for project services.

SUMMARY OF MAJOR FINDINGS

A total of 58 Title VII projects serving elementary-grade-level Native American students were identified through a review of applications and grant award documents in the files of the Office of Bilingual Education and Minority Languages Affairs (OBEMLA) in the U.S. Department of Education. Complete descriptive data were obtained on 56 of these 58 projects (97%), and 23 of the 56 projects were visited for intensive student-level data collection.

Most of the Title VII projects serving Indian students were relatively small. On the average, they received a Title VII grant for 1985-86 of $134,840 (range: $15,713-$320,352) and served an average of 201 Indian students in grades K-6 (range: 12 - 734 students). Projects averaged 4.9 full-time staff and 2.8 part-time staff, including the project director and support personnel. The majority of these staff members were aides or tutors.

All Title VII projects serving Native American students stated that the improvement of Indian LEP students' English language proficiency was a goal, and 80% also cited it as a primary operational objective. About half (54%) also reported that maintenance or improvement of the students' native language was a goal. For all of the 23 projects selected for site visits, improvement of students' English-language proficiency was the primary goal, and 12 (52%) had maintenance or improvement of the students' Indian language proficiency as a goal as well. The project services most often provided to students to address these goals were bilingual/ESL/Indian language aides (51%) and materials development (47%).

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[1] Abbreviations and other special terms used in this study are defined in the glossary in Appendix B.

Of the elementary-grade-level students in the schools served by the 56 Title VII projects for Native Americans, an average of 63% are classified as being limited-English-proficient by local criteria. Most of the projects (87%) indicated use of a home language survey as the first step in determining student eligibility for Title VII services. The same percentage (87%) stated that the score on a test of English language oral proficiency was used as an entry criterion. In addition, 76% of the projects used the results from a test of students' literacy in English, 44% used findings from a test of students' oral proficiency in an Indian language, and 27% used the results from a test of students' literacy in the Indian language. Most projects (89%) also considered teacher or other staff judgments as a factor.

Almost all of the 32 schools served by the 23 projects selected for site visits used a formal testing procedure for determining eligibility for Title VII services, although the types of tests and the cut-offs used varied. In only four cases was there no formal testing to determine eligibility: in two cases the process relied only on teacher judgment, and in two cases there was no formal process at all.

Where there was a formal evaluation process, the prior issue of deciding which students would be evaluated involved either the use of a home language survey, teacher's recommendation, or a combination of these methods. In three of the schools studied, all students in grades K-3 were evaluated as a matter of routine.

Once identified as LEP, students in those schools with a formal assessment process always were reassessed at least once each year. In almost half of these schools (48%) students were reassessed at least twice a year, usually in the spring and fall.

2A

A. PROJECT SIZE AND DURATION

A review of applications and grant award documents in the files of the Office of Bilingual Education and Minority Languages Affairs (OBEMLA) revealed 58 projects funded under Title VII in 1985 serving elementary-grade-level Native American students. Complete descriptive data were obtained on 56 (97%) of these projects through a review of OBEMLA files and telephone conversations with project staff. The Title VII basic grants to these projects in 1985-86 averaged $134,840, with a range from $15,713 to $320,352. These projects served an average of 201 Native American students in grades K-6, with the smallest serving 12 students and the largest serving 734.

Twenty-three of these Title VII projects were selected for site visits to gather student-level data. These 23 projects provided services for Indian students in 32 schools. Table 2.1 shows, for each visited project, the number of Indian LEP students in grade K through 6 who were reported by project directors to be served by the project (column A), the amount of Title VII grant funds received by the projects for the 1985-86 school year (column B), and the number of years which the project has operated under its current grant (column D). Also provided is the amount of Title VII grant money expended per student by each project (column C), calculated by dividing the dollar amount in column B by the number of students in column A.

Grants to individual projects ranged from a low of $62,925 for a project serving 50 students to a high of $268,264 for a project serving 560 students. Most of the projects (11) included in the study were in their second year of funding under their current grant; of the other projects, six were in their third year of the three-year funding cycle, and six were in their first year of the cycle.

TABLE 2.1. Size and duration of visited Title VII projects

Project	A Number of Indian LEP K-6 Students Receiving Title VII Services in 1985-86	B Amount of Title VII Project Grant for 1985-86*	C Per Student Title VII Expenditure (Col. B divided by Col. A)	D Number of Years Project Has Operated Under Current Title VII Grant
1	101	$168,329	$1,667	2
2	117	90,734	776	3
3	141	166,385	1,180	1
4	68	79,784	1,173	2
5	604	130,783	217	2
6	185	88,329	478	3
7	137	97,851	714	1
8	560	268,264	479	1
9	114	116,121	1,019	1
10	214	201,864**	983	1
11	92	96,459	1,048	2
12	59	87,716	1,487	1
13	128	151,227	1,182	3
14	68	112,900	973	2
15	62	81,548	1,315	3
16	149	125,112	840	2
17	50	62,925	1,259	2
18	109	156,553	1,436	2
19	100	102,165	1,022	2
20	108	143,370	1,328	2
21	66	89,649	1,358	3
22	148	242,330	1,627	3
23	60	86,532	1,442	2

*Unless otherwise noted, funds are for Title VII Transitional Bilingual Education Programs.

**This figure includes funds from a $119,635 Materials Development Grant as well as $82,229 from a Transitional Bilingual Education Grant.

As Table 2.1 also shows, the average per student expenditure tends to decrease as the number of students served by the project increases. Given that Title VII funds are generally used to fund support services (e.g., aides, resource teachers, project administrators) and materials development rather than actual instruction to individual students, this pattern is to be expected.

2B B. PROJECT GOALS AND OPERATIONAL OBJECTIVES

A goal of all 56 of the Title VII projects serving Native American students was to improve the English language proficiency of their Indian students (Table 2.2), and 80% of the project directors indicated that increasing students' English proficiency was also one of their primary operational objectives (Table 2.3). Conversely, developing or maintaining the students' proficiency in the local Native American language was a goal of 54% of the projects and a primary operational objective of 18%.

Tables 2.4 and 2.5 provide the goals and primary objectives of each of the 23 visited projects. As indicated, all twenty-three of the visited projects indicated that the improvement of Indian LEP students' English proficiency is a major goal. In addition, twenty-two (96%) indicated that the improvement of Indian LEP students' classroom and test taking skills was a major project goal; sixteen (78%) reported that keeping Indian LEP students from falling behind English-proficient students in knowledge of subject matter content by teaching math, science, and social studies in the child's native Indian language was a major project goal; and twelve projects (52%) indicated that a major goal was to improve the Indian language proficiency of the Indian LEP students whom they serve.

With respect to objectives of visited projects, directors of all twenty-three reported that increasing Indian LEP students' English-language proficiency was a primary objective. However, far fewer mentioned improving students' academic skills (17%) or maintaining/improving students' Indian language proficiency (22%) as primary objectives. (Since these objectives were mentioned in response to an open-ended question, the actual number of projects devoting efforts to these goals may be somewhat higher.)

TABLE 2.2. Goals of Title VII projects serving elementary grade-level Native American students*

(N = 56)

Goal	Percentage of Projects
1. Improve Native American students' English-language proficiency	100%
2. Provide Native American LEP students with the skills (other than English language) necessary to function effectively in classrooms (e.g., test-taking skills)	89
3. Develop/maintain/improve Native American students' proficiency in their Native American language	54
4. Provide Native American LEP students with subject matter content in their native language until they become proficient in English	47
5. Other	47

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* The data are based on responses to questions asked of project directors during a telephone interview.

TABLE 2.3. Primary operational objectives of Title VII projects serving elementary grade-level Native American students*

(N = 56)

Objective	Percentage of Projects
1. Increase students' English proficiency	80%
2. Increase students' proficiency in the Native American language	18
3. Improve students' academic skills	15
4. Improve students' self-image/self-esteem	15
5. Improve students' cultural awareness	9
6. Make students more competitive in society	9
7. Reduce student drop-out	7
8. Maintain Native American values among students	7
9. Curriculum development	7
10. Parent training	4
11. Staff development	2

* The data are based on responses to an open-ended question asked as part of a telephone interview with project directors.

TABLE 2.4. Goals of visited Title VII projects*

	A	B	C	D	E
Project	To Improve the English Proficiency of Indian LEP Students	To Develop or Improve the Proficiency of LEP Students in their Indian Language	To Keep LEP Students From Falling Behind English Proficient Students in Subject Matter Content**	To Improve LEP Students' Classroom and Test-Taking Skills	Other
1	X	X	X	X	
2	X		X	X	
3	X		X	X	
4	X			X	X
5	X			X	
6	X		X	X	
7	X	X	X	X	
8	X		X	X	
9	X	X	X		
10	X	X	X	X	X
11	X		X	X	
12	X	X	X	X	X
13	X			X	
14	X	X	X	X	
15	X			X	X
16	X	X	X	X	
17	X			X	
18	X		X	X	X
19	X	X		X	X
20	X	X	X	X	
21	X	X		X	
22	X	X	X	X	
23	X	X	X	X	
TOTAL	23	12	16	16	6

*The data are based on responses to questions asked project directors during a telephone interview.

**By teaching math, science, social studies, etc., in the Indian language.

TABLE 2.5. Primary operational objectives of visited Title VII projects*

	A	B	C	D	E
Project	Increase Students' English Proficiency	Maintain/Increase Students' Indian Language Proficiency	Improve Students' Academic Skills	Improve Students' Self-Image/ Self-Esteem	Improve Students' Knowledge/ Awareness of Indian Culture
1	X				
2	X				
3	X	X	X		
4	X				
5	X				
6	X				
7	X	X			
8	X				
9	X		X		
10	X		X	X	
11	X				
12	X			X	X
13	X				
14	X				
15	X			X	
16	X	X			
17	X				
18	X				
19	X				
20	X			X	
21	X	X		X	
22	X		X	X	
23	X	X	X		
TOTAL	23	5	5	6	1

*The data are based on responses to an open-ended question asked as part of a telephone interview with project directors.

2C

C. PROJECT SERVICES

The major services which the 56 funded Title VII projects provided to Indian students are summarized in Table 2.6. As shown, the most frequent service was the provision of classroom aides to assist children with language related problems. Slightly over half of the projects (51%) provided bilingual classroom aides or translators, and another 7% provided ESL aides. Overall, aides and tutors constituted the largest proportion of the staff members employed by the 56 projects. On the average, projects employed three full-time and one and one-half part-time aides and tutors, one full-time and one part-time resource/support staff members (e.g., resource teacher, curriculum development specialist), and one full-time and one part-time administrative staff member (including the project director and secretary).

The next most frequent service, reported by 47% of the projects, was the development or acquisition of instructional materials suitable for Native American children. These materials pertained primarily to English language instruction, instruction in the local Indian language, and instruction in local Indian culture. The frequency of materials development as a project service results from the dearth of existing instructional materials in most Native American languages, the similar lack of instructional materials which are sensitive to the diverse cultures of Native Americans, and the general lack of individuals or institutions outside the projects who have the necessary linguistic, cultural, and curricular knowledge for creating these materials.

Information on the services provided in the 23 visited projects is provided in Table 2.7. Of the services provided by these 23 projects, the most frequent were Indian language aides, reported by fifteen projects (65%); ESL aides, reported by eleven projects (48%); and materials development, reported by ten projects (43%).

TABLE 2.6. Services of Title VII projects serving elementary-grade-level Native American students

(N = 56)

Service	Percentage of Projects
1. Bilingual aides/classroom translators	51%
2. Materials development	47
3. Community/parent development	32
4. Cultural heritage instruction	27
5. Staff development	25
6. Computer assisted instruction	25
7. Tutorials in content subjects	13
8. Home/school liaison	11
9. ESL aides (English speaking only)	7
10. Native American language arts teacher	5
11. English language arts teacher	2
12. ESL instruction for parents	2
13. Language laboratory	2
14. Miscellaneous other services	11

TABLE 2.7. Services of visited Title VII projects

Project	A Indian Language Aides	B English Speaking ESL Aides	C Resource Teacher	D Academic Subject Tutorials	E Parent/ Community Involvement	F Computer Assisted Instruction	G Cultural Activities	H Materials Development
1	X	X		X				
2					X		X	X
3	X	X		X	X	X		X
4			X				X	X
5					X			
6	X				X			
7	X	X		X		X		
8	X	X					X	
9					X	X		X
10	X		X	X				X
11	X	X						X
12								X
13	X	X	X	X	X	X		
14	X	X	X	X		X		
15					X	X	X	X
16			X		X		X	
17		X	X			X		X
18	X	X		X		X		
19	X	X		X				
20	X							
21	X		X		X	X		X
22	X	X	X					
23	X							
TOTAL	15	11	8	8	9	9	5	10

2D D. POLICIES AND PRACTICES RELATING TO ELIGIBILITY FOR TITLE VII PROJECT SERVICES

In order to assess the services provided by Title VII projects it is important to understand the practices and procedures by which students are determined to be eligible for program services. Particularly important are how students are identified as Indian, how they are determined to be limited-English-proficient, and how they enter into and eventually leave special educational programs designed for them. Since Title VII projects are to serve students with limited proficiency in English, it would be logical for the program entry process to begin either with the identification of a student as LEP or as Indian. Interestingly, in every case within the visited projects, the process began with the identification of a student as an Indian, and in 63% of the schools all students at the targeted grade levels participated in the project since almost all students in the schools were Indian and met the local definitions of LEP.

2D.1 DEFINITION OF AN INDIAN

The first step in determining who might be eligible for special services for Indian students was to decide who was an Indian. As shown in Table 2.8, the most frequently used means of determining Indian status reported by personnel in the 32 schools at the 23 visited projects was the student's tribal roll number or presence on the tribal rolls. In terms of numbers of students, the next most frequently used means was a completed 506 form certifying that a child was eligible for services funded through the Indian Education Act. In some schools (28%), the primary means was the possession of a Certification of Degree of Indian Blood (CDIB) card issued by the Bureau of Indian Affairs; the schools relied on the CDIB card in the relatively few cases where there was no tribal roll number.

TABLE 2.8. Definitions of Indian students in the visited Title VII projects

Basis of Identification	Schools Using the Indicated Requirement*		Students Identified as Indian on Indicated Basis**	
	No.	%	No.	%
Tribal roll number	17	53%	762	63%
Tribal roll number or Certificate of Degree of Indian Blood card (CDIB) from Bureau of Indian Affairs	9	28	88	7
506 form certifying eligibility for Title IV of Indian Education Act	3	9	366	30
Either 506 form or CDIB	3	9	-	-
TOTAL	32	100%	1216	100%

*The 32 schools were in the 23 projects which received site visits. Total does not add to 100% because of rounding error.

**Percentage is of those for whom information was available. Data were not available on 227 (15.7%) of the students.

2D.2 DEFINITION OF LIMITED ENGLISH PROFICIENCY

Of the students in the visited projects, 78% had been classified by their school district as LEP and 22% had never been formally designated as such.[1] In the case of 90% of the LEP students, the classification was made when they were in kindergarten.

To determine whether or not students were limited-English-proficient, almost all schools used a formal testing procedure. In 29 of the 32 schools (91%), determination of limited English proficiency involved some form of objective testing although the types of tests and cut-off scores varied considerably. As shown in Table 2.9, in 18 cases the process involved use of English proficiency tests; in 17 cases it involved academic achievement tests; in two cases it involved the use of Indian language proficiency tests; in two cases it relied partly on teacher judgment; in one case it relied solely on teacher judgment; and in two cases there was no formal process at all.

Where there was a formal evaluation process, the prior issue of deciding which students would be evaluated involved the use of a home language survey in 23 of the schools (72%). As shown in Table 2.10, a teacher's recommendation was necessary in 15 (47%) of the schools, sometimes by itself and sometimes in conjunction with a home survey or other factor. In three of the schools, all students in grades K-3 were evaluated as a matter of routine.

Once identified as LEP, students in those schools with a formal assessment process always were reassessed at least once each year. In almost half of these schools (48%), students were reassessed at least twice a year, usually in the spring and fall.

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[1] Note that 22% non-LEP students served by Title VII projects is well within the legislative constraints of Title VII, which permits projects to serve up to 40% English-proficient students (§703(a)(4)(B)).

TABLE 2.9. Methods of evaluating students to determine if they are LEP

Method	Number of Schools	Percentage
Achievement test	9	28%
English proficiency test	8	25
Combination of achievement and English proficiency tests	6	19
Combination of achievement test, English proficiency test and Indian Language proficiency test	1	3
English proficiency test and teacher evaluation	1	3
Teacher evaluation only	1	3
Multistage testing - specifics not given	2	6
Combination of achievement test, English proficiency test and teacher evaluation	1	3
Combination of English and Indian language proficiency tests	1	3
No formal procedure	2	6
TOTAL	32	100%*

*Total does not add to 100% because of rounding error.

TABLE 2.10. Basis for deciding which Indian students will be evaluated for special services for Indian LEP students

Basis	Number of Schools	Percentage
Home language survey only	10	31%
Home language survey and teacher recommendation	10	31
Home language survey, teacher recommendation and standardized test scores	3	9
Teacher recommendation only	2	6
Recommendation of the principal and teachers who know community and families	2	6
All students are evaluated	2	5
Parental requests only	1	3
No evaluation process; all students receive services	2	6
TOTAL	32	100%*

*Total does not add to 100% because of rounding error.

Chapter 3. CHARACTERISTICS OF INDIAN STUDENTS' SCHOOL, HOME, AND COMMUNITY ENVIRONMENTS[1]

This chapter examines selected characteristics of the school, home and community environments of Indian LEP students which may be related to their academic success. The more salient findings discussed in this chapter are summarized below. The chapter is organized into four major sections: A. School Governance, Location, and Size; B. Home and Community Language Use; C. Family Characteristics; and D. School Language Environment.

SUMMARY OF MAJOR FINDINGS

The study sample of 23 projects included 17 public schools, 12 tribally controlled schools, and 3 Bureau of Indian Affairs controlled schools. All of the 32 visited schools were located in extremely remote, poor areas of the country, on or near current or former Indian reservations. Most of the schools were small; they ranged in size from 31 to 592 students, with the average being 144 students.

Information regarding language use in the 24 communities[2] served by these schools revealed three quite different situations. There were communities in which an Indian language was used more than English for daily communication (e.g., certain communities on the Crow and Navajo reservations), communities in which an Indian language and English were used about equally, and communities in which English was used almost exclusively. Slightly over half of the parents surveyed reported that both English and the local Indian language were used in the home while about a third reported that only English was spoken in the home.

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[1] Abbreviations and other special terms used in this study are defined in the glossary in Appendix B.

[2] Data from the 23 projects are reported in terms of 24 communities because the situation in the two schools served by one of the projects was not at all the same; for this reason, that project is treated as two separate entities in most subsequent analyses.

The parents of 36% of the Indian students reported that they expected their children to go on to college, and an additional 10% expected their children to attend professional or graduate school (e.g., law school, medical school).

3A A. SCHOOL GOVERNANCE, LOCATION, AND SIZE

3A.1 SCHOOL GOVERNANCE

Schools attended by Indian students may be classified into four types according to the governing body responsible for school administration. These four types are: (a) public schools, (b) private (usually religiously affiliated) schools, (c) Bureau of Indian Affairs (BIA) controlled schools, and (c) tribally controlled schools.[1] The study sample of 23 projects included 17 public schools, 12 tribally controlled schools, and 3 BIA controlled schools.

3A.2 SCHOOL LOCATION

Where a school is located can be a useful indicator of the socioeconomic status of students, and thus can be a barometer of schooling factors including the type of technological, curricular, and personnel resources available to students (Brookover & Schneider, 1975; Brookover & Lezotte, 1979; McDill & Rigsby, 1973). There are two aspects of school location which are important for this study. The first is whether or not the school is on or adjacent to a reservation. The second is the socioeconomic level of the immediate environs. Regarding the first, all of the schools were located on or adjacent to a current or past Indian reservation and are in relatively remote, rural areas.[2]

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[1] Tribally controlled schools are those schools which are operated by a tribe under contract to the Bureau of Indian Affairs.

[2] The four not on or near a reservation were all located in rural "Cherokee country" of Oklahoma; i.e., the land area formerly encompassed by the Cherokee reservation.

Data regarding the socioeconomic level of the school's immediate environs were taken from a form completed by study data collectors and reviewed by school principals. Respondents characterized school neighborhoods to be one of the following: 1) affluent, 2) a mix of middle income and affluent, 3) middle income, 4) mix of low and middle income, or 5) low income. No schools were identified to be in affluent, or even a mix of middle income and affluent neighborhoods. Indeed, 69% of the 32 visited schools were categorized as being in a low income neighborhood, 25% were in a mix of low and middle income neighborhoods, and the other 6% of the schools were considered to be in middle income neighborhoods.

3A.3 SCHOOL ENROLLMENT

School size has been found to affect how students are supported and challenged in the educational process (Flagg, 1964; Morocco, 1978). For LEP students this may be particularly important because it may influence how quickly they learn English and how comfortable they feel in the academic program being provided in school, both being factors that may ultimately influence student achievement. Equally important may be the proportion of Indian students in the student body.

For the elementary schools that participated in the study, the number of students in grades 1-5 averaged 144, with a range from 31 to 592. Table 3.1 provides an overview of the number and percentage of the schools in the study in terms of grade 1-5 enrollment. The percentage of total enrollment of Indian LEP students in the schools in grades 1-5 is given in Table 3.2.

3B B. COMMUNITY AND HOME LANGUAGE USE

3B.1 EXTENT OF NATIVE AMERICAN AND ENGLISH LANGUAGE USE IN THE COMMUNITY

The extent of use of a local tribal language, English, and other languages varies greatly among Indian communities. There are whole communities which are nearly monolingual in an Indian language (e.g., some isolated Navajo communities); communities where just about everyone is proficient in English and the native language, and in which people use

TABLE 3.1. School enrollment in grades 1-5

Enrollment in Grades 1-5	Number of Schools	Percentage
31-50	6	19%
51-100	10	31
101-200	9	28
201-400	5	16
401-592	2	6
TOTAL	32	100%

TABLE 3.2. School enrollment of Indian LEP students in grades 1-5

Percent Indian LEP of Total Enrollment	Number of Schools	Percentage
0-20	3	9%
21-50	0	0
51-70	4	13
71-90	5	16
91-99	8	25
100	12	37
TOTAL	32	100%

both on a daily basis (e.g., some Crow communities); and communities which are nearly monolingual in English (e.g., some Indian communities in the eastern United States). Also, the extent of use of an Indian language, English, and other languages will vary from home to home within a community.

To assess the extent to which Indian languages and English are used as means of daily communication in the study's communities, data were collected from parents and community leaders. They were asked to identify the language most frequently used in the following types of social situations:[1]

a. When elders (grandparents, clan mothers, tribal leaders, etc.) are talking, gossiping, or joking with one another;

b. During traditional religious, curing, or other ceremonies;

c. In church, when the minister or priest is preaching to the congregation during Christian religious ceremonies;

d. Among tribal leaders and other participants during tribal council meetings;

e. Among children in the community when they are playing with one another;

f. Among adults in the community when they are conducting business with other community members;

g. When adults speak to children in the home;

h. When adults speak with other adults in the home;

i. When children speak to adults in the home; and,

j. When children speak with other children in the home.

For each of these situations, respondents were asked to specify whether the language or languages most frequently heard were: 1) the local Indian language, 2) English, or 3) another language. Respondents were also given the opportunity to state 'Don't Know' for each situation.

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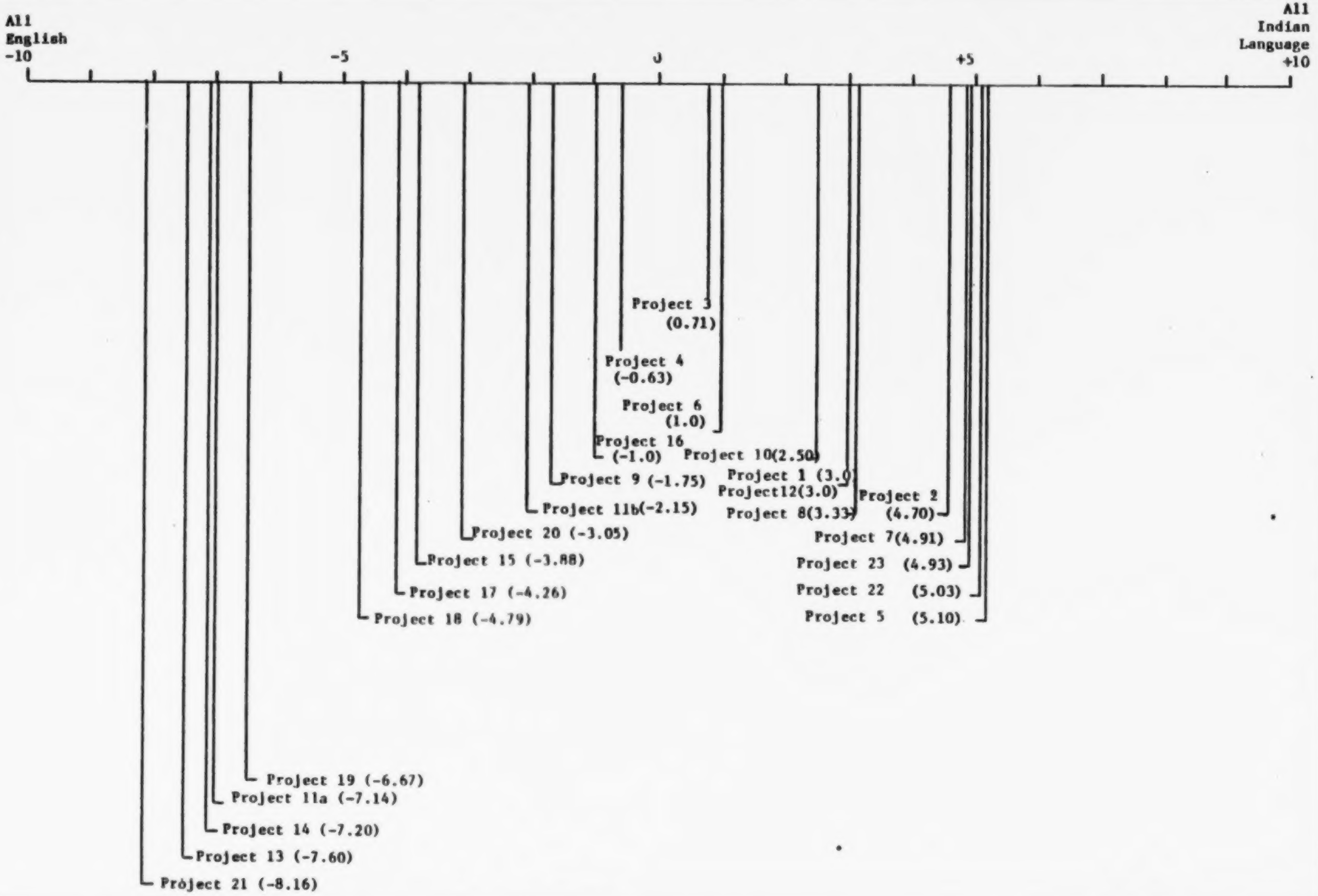
[1] The selection of specific social situations was taken from the linguistics and anthropological literature on language death and obsolescence (e.g., Dressler and Wodak-Leodolter 1977).

To arrive at an index of the extent of native language use in the communities associated with each sample site, a difference score was calculated by eliminating all 'Don't Know' or 'Other Language' responses, and subtracting the total number of positive responses to 'Use English' from the total number of positive responses to 'Use Local Indian Language' for all respondents from each community. The scores could range anywhere along a scale from -10 (English is the only language heard in all of the specified social situations) to +10 (the local Indian language is the only language heard in all of the specified social situations), with a score of zero indicating that English and the local Indian language are used about equally in the community.

To determine the extent of native language use, data from all of the completed forms for a site were averaged to compute the score since it was assumed that all of the students at a site came from a single community. However, data provided by the director of one project, and supported by statements from linguists familiar with the language situation there, indicated that linguistically the communities served by the project's two schools differed substantially from each other. In one case the local Indian language is used little in the community while in the other the local Indian language is used more widely. Therefore, two different scores were computed for this site (Project 11a and Project 11b). Also, because insufficient information was obtained from another project to compute a score, the rating was based on data provided by site personnel and linguists familiar with the community; the project (Project 12) was assigned a score of +3.0.

As shown in Exhibit 3.1, the 24 communities represent a broad range of different situations with regard to use of English and the local Indian language. As the exhibit shows, the project receiving the lowest rating received a score of -8.16 (Project 21), indicating that English was used predominantly in the community but that there was at least some use of the Indian language as well. Thus there was at least some—even though in some cases very little—use of the local Indian language in all of the

EXHIBIT 3.1. Extent of Indian language use in the community



project communities. Conversely, in the communities with scores indicating more use of the Indian language than of English, the highest score was +5.10 (for Project 5), indicating some consistent use of English in all cases.

Because the extent of Indian language use in an Indian child's community is potentially an important variable and may be highly correlated with program services and their outcomes in terms of school performance in English, projects were put into three categories for some subsequent analyses. These three categories are: (1) predominant use of the Indian language in the community: possible score range of +2.5 to +10; (2) roughly equal use of the Indian language and English: possible score range of -2.499 to +2.499; and (3) predominant use of English in the community: possible score range of -2.5 to -10. The projects in each category are shown in Table 3.3, below.

TABLE 3.3. Categories of community language use based on community language use index

Category	N	Project
(1) Predominant Use of English Language in the Community. Possible Range: -2.5 to -10	9	13,14,21 11a,19, 15,17,18,20
(2) Roughly Equal Use of the Indian Language and English. Possible Range: -2.49 to +2.49	6	3,4,6,9,11b, 16
(3) Predominant Use of the Indian Language in the Community. Possible Range: +2.5 to +10	9	1,2,5,7,8,10, 12,22,23

3B.2 IMPORTANCE OF THE INDIAN LANGUAGE TO THE NATIVE AMERICAN COMMUNITY

The value which community members place on the ability to speak a language will greatly affect a child's learning of that language. There are some dramatic examples of this. Outside the U.S., for example, the successful maintenance of the Welsh language in Wales, where the Welsh people value the language highly as a facet of their identity as a group, may be contrasted with the decline in the use of Irish Gaelic in the Irish Republic where the use of English is more highly valued (MacNamara, 1971).

Even more dramatic examples can be found concerning Indian languages. For example, federal policies and regulations in the late 1800's actively discouraged the use of Indian languages at Indian boarding schools in order to promote the learning of English. Tuscarora children attending these schools were sometimes severely punished for using the language. As a result, when these children grew to adulthood and had children of their own, most refused to teach the Tuscarora language to their children. Today, the only native speakers of the Tuscarora language--around 25 in number--are grandparents' whose children and children's children are native speakers of English, and know little of their grandparents' native language. Thus by emphasizing the learning of English and devaluing the learning of the native language, today's elders are both directly and indirectly responsible for the high degree of English proficiency amongst tribal members and for the near extinction of the Tuscarora language.

It is doubtful that such dramatic cases of devaluation of the importance of learning the native language could be found today. Rather, it appears that the great majority of Indian parents and community leaders consider it important for Indian children to learn their Indian language as well as English. When community members in this study were asked how important it is for Indian children to learn English, 88% responded it was "very important" and the remaining 12% responded "somewhat important." When asked to explain why their children should learn English, 47% indicated simply that it was the widely used national language, and another 40% said it was essential for getting a job or further education.

To the same question with respect to learning the local Indian language, 79% of the community members indicated that the Indian language was "very important" for their children to learn and 19% responded it was "somewhat important." The most frequently given reasons for the importance of children's learning the local Indian language were that it is "needed to understand the Indian way of life" (22%), that it is important to "pass on the Indian language" to future generations (21%), and that it is needed to "preserve the Indian heritage and culture" (18%). In addition, of the total 61% who indicated that learning the local Indian language was important in order to understand and preserve the Indian culture, 14% of these additionally viewed the Indian language as a functional necessity required for communicating with family and community leaders (12%) or for getting a job (2%).

Community members were also asked whether the children should learn the local Indian language in the home, in the school, or both in the home and in school. The vast majority (86%) stated that the language should be learned both in the home and in school while 9% stated that the language should be learned only in school, and 5% stated the language should be learned only in the home.

On a related topic, community members were asked what language their children should be taught to speak, read, and write in school, and what language teachers should use in providing instruction to their children. The responses were similar to these two questions, with 90% of the community members saying that children should be taught to speak, read, and write both languages in school and 82% saying that both languages should be used in providing instruction. Only 9% said that the children should be taught in school to speak, read, and write English but not the Indian language, and only 17% said that the sole language of instruction should be English.

3B.3 EXTENT OF INDIAN AND ENGLISH-LANGUAGE USE IN THE HOME

The pattern of language usage in the home is more directly related to the child's language skills than either the community's use of English or Indian languages or the community's attitude concerning language usage. Parents who do not speak English in the home do not reinforce English skills learned in school and may not be able to help with homework.

Therefore, parents were asked which languages were used by the mother or female guardian in the home and by the father or male guardian. The responses were combined to create three categories of language use by parents: 1) one or more non-English languages, but not English; 2) English and at least one other language; and 3) English only. The results are presented in Table 3.4.

TABLE 3.4. Languages used in the home by parents of Indian students

	N	Non-English Only	English and Non-English	English Only	Total
Grade 1	422	15%	55%	30%	100%
Grade 3	395	11%	53%	36%	100%

Table 3.5 provides a project-by-project comparison of the pattern of use of English and an Indian language in students' homes with the index of Indian language use in the communities served by the projects. As the data in this table show, Indian language usage in students' homes tends to be greater in communities where there is greater usage in general of the Indian language.

TABLE 3.5. Home and community language use by Title VII project

Project	Languages Used at Home by Indian Parents (Percentage of Parents)			N	Index of Extent of Indian Language Use in the Community
	Indian Language Only	Indian Language and English	English Only		
5	25%	71%	4%	117	+5.10
22	72	26	2	58	+5.03
23	42	42	17	12	+4.93
7	16	84	0	31	+4.91
2	16	74	10	19	+4.70
8	3	89	8	93	+3.33
12	-	-	-	0	+3.00
1	-	-	-	0	+3.00
10	-	-	-	0	+2.50
6	46	36	18	22	+1.00
3	2	82	16	50	+0.71
4	0	89	11	9	-0.63
16	4	85	11	27	-1.00
9	2	79	20	56	-1.75
11b	0	10	90	10	-2.15
20	2	88	11	57	-3.05
15	6	39	56	18	-3.88
17	11	50	39	18	-4.26
18	4	46	50	24	-4.79
19	0	11	89	62	-6.67
11a	0	0	100	27	-7.14
14	0	0	100	19	-7.20
13	0	2	98	51	-7.60
21	0	14	86	37	-8.16

3C

C. FAMILY CHARACTERISTICS

Family structure and parents' educational levels are also factors which have been shown to be related to academic achievement (Laosa, 1982b; Laosa, 1982b; Henderson, 1981; Lambert, 1977; National Center for Education Statistics, 1978; Rosenthal, Baker & Ginsberg, 1983). Therefore, a number of questions were asked about the parents or guardians as well as other family members of Indian students.

3C.1 EDUCATION AND OCCUPATION

Respondents were asked to indicate the level of education of the female and male guardians. As Table 3.6 indicates, fathers of Indian students had completed an average of one-half year more of schooling than had mothers. A comparison of the level of education of Indian parents to that of parents of language-minority limited-English-proficient (LM-LEP) students nationwide shows that Indian parents report an average of three years more of schooling than other LM-LEP parents.[1]

The educational levels of parents were included as part of a broader composite of family socioeconomic status. The composite also contained a simple measure of occupational status (see Appendix D) which was coded on a 1-5 scale designed for this study. The status of the mother's or father's occupation (whichever was higher) was combined with the mean educational level of the parents to produce a scale ranging from 3 to 29. The number of households with socioeconomic status scores was limited, however, because some parents did not answer this item, and some families had no one working outside the home. (These families did not receive ratings either because of lack of data or because of the lack of clarity in the data provided.) In Table 3.7 the socioeconomic composite score for Indian parents is compared with that obtained for LM-LEP parents nationwide.

3C.2 PARENTAL INTEREST AND INVOLVEMENT IN SCHOOL

There is also considerable evidence to suggest that parents' interest and involvement in education can affect the academic outcomes of their children (Gore, 1974; Kjolseth, 1972; Cervantes, 1978; Cervantes, Baca, & Torres, 1979). Therefore, a series of questions was asked relating to parent involvement.

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[1] All findings on LM-LEP students and parents reported in this chapter are taken from Young et al. (1986).

TABLE 3.6. Comparison of the mean years of education of mothers and fathers of Indian students and of mothers and fathers of LM-LEP students*

Group	Mothers		Fathers	
	Mean**	N	Mean**	N
Grade 1				
Indian	10.0	411	10.6	317
LM-LEP	7.1	4167	7.6	3286
Grade 3				
Indian	10.0	380	10.5	299
LM-LEP	6.6	3230	7.3	2575

*Data on LM-LEP parents taken from Young et al. (1986), Chapter 3, Table 3.2.

**If more than 13 years, a value of 14 years is included in the mean.

TABLE 3.7. Comparison of socioeconomic composite scores for families of Indian students and families of LM-LEP students*

Group	Mean**	Standard Deviation	N
Grade 1			
Indian	18.0	4.6	294
LM-LEP	14.3	5.3	2359
Grade 3			
Indian	18.4	4.7	266
LM-LEP	13.8	5.2	1786

*Data on LM-LEP parents taken from Young et al. (1986), Chapter 3, Table 3.3.

**The range of this composite was from 3 to 29. It was based on the mean educational level of the parents and the highest status occupation of the parents who worked outside the home. A more complete description of the composite is provided in Appendix D.

Parents were asked to indicate how frequently the student talked to grown-ups in the family about what happens in school. The responses are shown in Table 3.8 where they are compared to results from the LM-LEP Study. Overall, 76% of Indian parents reported discussing school with their students "almost every day." As also shown, discussions between Indian students and their parents are, in general, slightly less frequent than are discussions about school between LM-LEP students and their parents.

The academic orientation of a family can also be inferred from various activities in a household. Parents with high educational expectations may require that children spend more time on homework, may read more to their children, or may encourage more reading. Table 3.9 shows the mean number of hours per week which Indian parents reported that their children spent doing homework, reading (other than homework), and being read to, and the corresponding results for LM-LEP parents nationwide. As is also shown, Indian students spend somewhat less time engaged in homework, but generally more time in reading or being read to, than do LM-LEP students nationwide.

TABLE 3.8. Comparison of the frequency of discussions about school between Indian students and their parents and between LM-LEP students and their parents*

		Frequency of discussion			
Group	N	Less than once a week	One to three times a week	Almost every day	Total
Grade 1					
Indian	315	7%	16%	77%	100%
LM-LEP	4467	4	12	84	100
Grade 3					
Indian	308	10%	15%	75%	100%
LM-LEP	3426	6	15	79	100

*Data on LM-LEP students and parents taken from Young et al. (1986), Chapter 3, Table 3.7.

TABLE 3.9. Comparison of the mean hours per week spent by Indian students and by LM-LEP students doing homework, reading (other than homework), and being read to*

Group	Doing homework Mean hours	Doing homework N	Reading Mean hours	Reading N	Being read to Mean hours	Being read to N
Grade 1:						
Indian	3.2	431	2.7	431	2.4	431
LM-LEP	4.7	4362	1.7	4359	1.9	4353
Grade 3:						
Indian	3.9	404	2.9	404	1.6	404
LM-LEP	5.4	3328	2.1	3338	1.6	3324

*Data on LM-LEP parents an students taken from Young *et al*. (1986), Chapter 3, Table 3.8.

When the responses of Indian parents were analyzed in terms of the extent of Indian language use in the project communities, there were no significant differences at either grade level with respect to time spent on homework or in reading. There was, however, a significant difference with respect to the number of hours a week that first-grade students are read to, with children in communities where the Indian language predominates being read to less (mean = 1.95 hours per week) than in communities where English predominates (mean = 2.5 hours per week) or where there is an approximately equal use of the two (mean = 3.1 hours per week).

In order to look at the family resources for helping students to learn the local Indian language, parents were asked first whether their child ever brings home schoolwork which involves use of an Indian language and then whether someone in the family helps the child with this school work. As shown in Table 3.10, 33% of parents reported that the child brings home homework involving use of an Indian language, and 63% of these parents reported that someone in the home helped the child while 27% reported there was no one in the home who knew the language well enough to provide any help. Children in communities in which an Indian language predominates or

TABLE 3.10. Parent responses to questions concerning Indian language resources in the home

	A. Brings home schoolwork involving use of Indian language?			B. Someone in the home helps?*				
	No	Don't Know	Yes	No, Can't	No, Doesn't Ask	No, Other	Yes	No. of Cases
Grade 1	62%	6%	32%	21%	11%	2%	67%	445
Grade 3	62%	4%	34%	32%	5%	3%	60%	409

*The full response options for this item were: No, because there is no one else in the home who knows how to speak or read the language; No, because the child does not ask for help; No, for some other reason; Yes

is used about equally with English were more likely to bring home work that required use of the Indian language than were children from communities where English predominated.

The parents' interest in schooling is also reflected in their perceptions of the relative importance of the education which the child receives in school versus the education which the child receives in the home, in the community, and elsewhere outside the school. When asked their opinion on this issue, 92% of the parents stated that they considered the education their children receive in school to be 'very important.'

Finally, the academic orientation of a family may be reflected in the expectations which parents have for the amount of schooling which the child will probably complete. The parents' educational expectations for students are shown in Table 3.11. The parents of 36% of Indian students expected their children to go on to college (but not beyond), and an additional 10% expected their children to attend professional or graduate school (e.g., law school, medical school). As the table shows, Indian parents have slightly lower educational expectations for their children than do LM-LEP parents in general.

TABLE 3.11. Comparison of Indian parents' and LM-LEP parents' educational expectations for their children*

Group	N	9th grade or less	High school graduate	Post-high school vocational school	College**	Total
Grade 1:						
Indian	424	2%	43%	8%	47%	100%
LM-LEP	3962	6	31	10	53	100
Grade 3:						
Indian	390	4%	41%	10%	45%	100%
LM-LEP	3104	8	31	12	49	100

*Data on LM-LEP students and parents taken from Young et al. (1986), Chapter 3, Table 3.9.

**Indian parents were provided with one more response option, 'professional/graduate school,' than were LM-LEP parents. For purposes of comparison, the percentage of parents who selected this option was added to the percentage who selected the option 'college.'

3D

D. SCHOOL LANGUAGE ENVIRONMENT

Because Indian LEP students' English language proficiency is an important factor in their educational attainment (Galliland, 1986), variables that affect the overall school language environment were identified. They include school district policies relative to the use of English and other languages both within and outside the instructional context, the principals' language background, the principals' attitudes toward the use of non-English languages in the school, and the use of English and other languages outside the classroom by principals, teachers, and students.

3D.1 SCHOOL DISTRICT POLICY TOWARD THE USE OF LANGUAGES OTHER THAN ENGLISH

School district policy toward the use of non-English languages provides a measure of the specialized resources available to assist Indian LEP children in the educational process. A specific district policy can also influence how instructional staff interact and react to Indian LEP students.

The data related to school policy toward the use of languages other than English are taken from responses to questions in the School District Policy Questionnaire. In 57% of the schools, respondents indicated that there was a district policy concerning the teaching of languages other than English as a subject area in the elementary grades; Indian students may receive instruction in the oral and/or written language arts of their native language in all of the schools with an explicit policy. In 25% of these schools, the policy is to encourage all students to learn a language other than English. In 83% of the schools there was a policy regarding the use of an Indian language in providing Title VII services. In every case the policy permits the Indian language to be used in the project, but in 32% it can be used only to support and clarify instruction and may not be the primary language in which instruction is offered. In addition, in 74% of the schools at least some of the instructional staff of Indian LEP students are required to be proficient in speaking at least one of the Indian languages of their students.

Taken together these findings reveal a change in school climate with respect to Indian language use from that reported as late as 1969 in "The Kennedy Report." As indicated in that report and other references, the general policy of most schools, in particular Bureau of Indian Affairs' schools, up to the 1970s was to discourage use of an Indian language by students and even to punish them for its use.

3D.2 USE OF LANGUAGES OTHER THAN ENGLISH IN NON-INSTRUCTIONAL CONTEXTS

The extent to which Indian LEP students, teachers, and other staff actually use a language other than English in non-instructional situations is another useful indicator of school language environment. A composite variable was therefore created that describes the extent to which principals, teachers, and students use a language other than English outside the classroom context. The composite is composed of three items: 1) the extent to which teachers use non-English languages when interacting with Indian LEP students; 2) the extent to which Indian LEP and English-proficient students use English when interacting outside the classroom; and 3) principals' use of a language other than English with non-English speaking students. A higher score on this composite indicates greater use of a language other than English, 3.0 being the lowest score possible and 6.0 being the highest score possible. The distribution of this composite, as shown in Table 3.12, indicates that English is the primary language used in the large majority of schools.

TABLE 3.12. Extent of non-English language use outside the classroom by principals, teachers, and students

Composite* Score	Number of Schools	Percentage
3.0-4.0	17	71%
4.1-5.0	5	21
5.1-6.0	2	8
TOTAL	24	100%

*The composite variable was created by combining responses from the three items: 1) The extent to which teachers use non-English languages when interacting with Indian LEP students; 2) the extent to which Indian students use English when interacting outside the classroom; and 3) principals' use of a language other than English with non-English speaking students. A higher score indicates greater non-English language use, 3.0 being the lowest score possible and 6.0 being the highest score possible.

Chapter 4. INSTRUCTION PROVIDED TO INDIAN STUDENTS[1]

This chapter describes the instructional program received by the Indian students in the visited schools. The description includes services provided to students through the regular school curriculum as well as special instructional services which the students receive because of their limited proficiency in English. Following a summary of major findings, the chapter begins with a description of the subjects taught and materials used and ends with a description of teacher characteristics.

SUMMARY OF MAJOR FINDINGS

An analysis of the number of hours of instruction in regular English language arts, special English language arts, and native language arts, together with the use of the native language by teachers when providing instruction in math, social studies, and science, showed that the largest number of Indian students (38.6% of first graders and 36.8% of third graders) received programs of instruction characterized by a relatively large amount of instruction in English, very little instruction in Indian language arts, and only a moderate use of the Indian language for providing instruction. There were no cases in which all or most of the instruction provided to Indian students was in the Indian language.

Both first and third grade Indian students received significantly more instruction in regular English (instruction in reading and other English language arts which is not modified for LEP students) than did LEP students in general nationwide (more than twice as much in first grade).[2] And while they received roughly the same amount of special English instruction (instruction in English language arts that is specifically designed for LEP students), Indian students received substantially less instruction in Indian language reading and other Indian language arts than LEP students nationwide received in their native language. Indian LEP students received an average of 12.8 hours per week of instruction in English in first grade and 10.9 hours in third grade, while LEP students nationwide reportedly received an average of 7.6 hours in first grade and 10.1 in third grade.

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[1] Abbreviations and other special terms used in this study are defined in the glossary in Appendix B.

[2] Information on LEP students nationwide is taken from Young et al. (1986).

With respect to teaching Indian languages, no instruction at all was provided in a quarter of the projects, and in over half of the rest of the projects students received less than three hours a week of such instruction. Overall, the Indian LEP students received an average of only 1.3 hours a week of instruction in an Indian language in first-grade and 0.9 hours in third. This compares to an average of 5.6 hours of instruction in native language arts in the national sample of first-grade LEP students and 3.7 hours for the national non-Indian group of third-grade LEPS.

Consistent with the emphasis on English language instruction, only about 11% of the main teachers of first-graders and 17% of third-grade teachers reported using any Indian language materials. On the other hand, when asked the extent to which their classroom materials were relevant to their Indian students' cultural experience, over a quarter indicated that none of their materials was relevant and over 50% more indicated some, but less than half of their materials was relevant to the cultural experience of their students.

Virtually all of the main teachers of the students in the study possessed state teaching certification as did 80% of the auxiliary teachers and over half the classroom aides and other support staff. Less than 5% of the main teachers and 10% of the auxiliary teachers, however, were certified in either bilingual education or ESL, and less than half the main teachers and less than a third of other personnel reported receiving any inservice or preservice training related to the instruction of LEP students within the past three years.

4A A. ACADEMIC SUBJECTS TAUGHT

During visits to the project schools each teacher of each student in the study was interviewed. Utilizing a specially developed questionnaire and reporting form, these teachers provided a description of the instructional program of each of their Indian students. Subsequently, the responses from each of the student's teachers were aggregated to provide a separate description of the instructional program of each student in the study.

Table 4.1 presents the percentage of students receiving instruction in each of the major academic subjects taught in lower elementary school grades. As the table shows, almost all the Indian students were receiving regular or mainstream instruction in English language arts. In addition, 64% were receiving special instruction in reading English. All the children received either regular English, special English, or both, and virtually all the students received instruction in math, science and social studies.

As Table 4.1 also shows, about a third of the students received instruction in reading the local Indian language, and about half (48%) received instruction in speaking an Indian language. Similarly, a little more than half of the students (57%) received instruction in Indian history or culture as a distinct area of study.

Table 4.2 provides the percentage of students receiving instruction in English and Indian language arts in each of the visited projects. As the table shows, all of the students in four-fifths (78%) of the projects were enrolled in regular English, and in a third (30%) of the projects all students received both regular English instruction and supplementary English instruction. Instruction in the students' local Indian language was not provided at all in a quarter (26%) of the projects.

4B B. AMOUNT OF INSTRUCTION IN ACADEMIC SUBJECTS

Instructional services provided to different groups of students may include the same range of subject areas but may vary in the amount of time allotted to instruction in those subjects. This is an important factor in

TABLE 4.1. Percentages of Indian students receiving instruction in specific academic subjects

	Grade 1	Grade 3
Subjects:		
Regular English*		
Reading	94%	97%
Other**	97	99
Special English*		
Oral English	70	56
Reading and Other**	47	38
Indian Language		
Oral	49	47
Reading	34	32
Mathematics	100	100
Science	99	92
Social Studies	97	94
Ethnic Heritage	55	59
No. of Students	665	587

*"Regular English" refers to the English instruction provided to monolingual English-speaking students and other students who are proficient in English. "Special English" refers to an instructional program, such as ESL, that utilizes materials and methods especially designed for teaching English to LEP students.

**"Other" refers to other language arts; i.e., language arts other than reading for Regular English; language arts other than reading; oral English for Special English instruction.

TABLE 4.2. Percentage of students receiving instruction in English and Indian language arts

	Grade 1				Grade 3			
Project	Regular English	Special English	Indian Oral Language	Indian Reading	Regular English	Special English	Indian Oral Language	Indian Reading
1	100%	100%	100%	100%	-	-	-	-
2	71	100	63	63	96%	49%	49%	0%
3	96	100	100	100	100	100	100	100
4	100	0	91	91	100	0	100	100
5	60	50	100	100	69	46	100	100
6	100	71	0	0	100	72	63	0
7	100	0	0	0	100	100	100	0
8	100	100	42	0	100	100	63	0
9	100	18	100	0	100	15	7	0
10	100	27	60	0	100	13	0	0
11a	100	100	100	100	100	100	100	100
11b	100	100	100	100	100	100	100	100
12	100	71	0	0	100	22	0	0
13	100	100	0	0	100	100	0	0
14	92	*	0	0	60	*	0	0
15	100	0	0	0	100	0	0	0
16	100	0	100	100	100	0	100	100
17	100	100	0	0	100	0	0	0
18	100	87	0	0	100	60	0	0
19	100	6	0	0	97	26	37	37
20	100	71	65	0	100	15	58	58
21	100	47	53	0	100	44	39	0
22	100	100	0	0	97	100	47	47
23	100	100	100	100	100	100	100	100

* Information not available

that much research has pointed to the significance for achievement outcomes of "time on task" or "engaged time," and of the amount of time spent in study of a particular subject (Fisher et al., 1978; Roshenshine & Berliner, 1978; Wiley & Harnischfeger, 1974).

Table 4.3 presents the data on the average number of hours per week of instruction in academic subjects for Indian students. To help put the data for Indian students into perspective, the table also shows the data from the first year of the LM-LEP Study regarding the findings for LM-LEP students nationally. In overall total hours of instruction, both the grade 1 and the grade 3 Indian students were similar to LM-LEP students.

At both first and third grades, Indian students received significantly more instruction in Regular English than did their LM-LEP peers (more than twice as much in first grade), and they received roughly the same amount of Special English instruction. At the first grade the two groups were very similar to each other with regard to hours of instruction in mathematics, science, social studies, and ethnic heritage. However, grade 3 Indian students received somewhat more hours of instruction in science, social studies, and ethnic heritage--although about the same amount of mathematics-- than the LM-LEP grade 3 students. Also, Indian students received substantially less instruction in Indian language reading than did the other group.

With respect to instruction in speaking or reading an Indian language, further analyses (see Table 4.4) indicate that the number of hours per week of instruction in Indian language arts for those students receiving such instruction averaged 3 hours for first-graders (36 minutes a day) and 3.5 hours for third-graders (42 minutes a day). On a project-by-project basis, the range for first-graders is from 9.8 hours a week for eight students in one school to one-half hour a week for eight students in another school. For third-graders, the range is from one group of 15 students who received instruction in Indian language arts for 15.9 hours a week to students in two schools who received one-half hour of instruction a week. In the schools providing instruction in both speech and reading, about an equal amount of time was allocated to each.

TABLE 4.3. Mean number of hours per week of instruction in all academic subjects for Indian students compared to LM-LEP students[a]

	Grade 1		Grade 3	
Subjects:	Indian	LM-LEP	Indian	LM-LEP
Regular English[b]				
Reading	5.8	2.6	4.3	3.8
Other	4.0	2.1	3.7	3.0
Regular English Total	(9.8)	(4.7)	(8.0)	(6.8)
Special English[b]				
Oral English	2.0	2.7	1.6	1.9
Other	1.0	1.1	1.3	1.4
Special English Total	(3.0)	(3.8)	(2.9)	(3.3)
Indian Language				
Reading	0.4	3.5	0.3	2.4
Other	—	2.1	—	1.3
Oral	0.9	—	0.6	—
Indian Language Total	(1.3)	(5.6)	(0.9)	(3.7)
Mathematics	4.0	4.3	4.7	4.5
Science	1.7	1.7	2.3	1.8
Social Studies	1.5	1.8	2.4	1.9
Ethnic Heritage	0.6	0.4	0.9	0.4
Total	(21.9)	(22.3)	(22.1)	(22.4)
No. of Students[c]	576-577	4787-5286	472-474	769-891

[a] LM-LEP stands for language-minority, limited-English-proficient students. The means are based on all students for whom data were obtained; when students did not receive instruction in a particular subject area, a value of zero hours was included in the mean.

[b] "Regular English" refers to the English instruction provided to monolingual, English-speaking students and other students who are proficient in English. "Special English" refers to an instructional program, such as ESL, that utilizes materials and methods especially designed for teaching English to LEP students.

[c] A range of number of cases is provided because the number of valid cases varies for different subject areas.

TABLE 4.4. Hours per week of instruction in Indian language arts for those students receiving such instruction

	Grade 1		Grade 3	
Hours Per Week	No. of Projects	No. of Students	No. of Projects	No. of Students
1 hour or less	1	8	3	32
1.1 - 3.0 hours	6	210	5	118
3.1 - 5.0 hours	4	99	3	73
Over 5 hours	2	32	4	55
TOTAL	13	349	15	278
Mean	2.96 hrs/wk		3.50 hrs/wk	

When the extent of Indian language instruction is analyzed in terms of the extent of language use in the community, the results are as might be expected. More instruction was provided in the projects when the Indian language was predominant, particularly at the first grade level. The same is true with respect to instruction in ethnic heritage (see Table 4.5).

TABLE 4.5. Hours of instruction per week in Indian language arts and ethnic heritage by community language use

		Indian Language Arts		Ethnic Heritage	
Type of Community		Grade 1	Grade 3	Grade 1	Grade 3
Predominantly English	Mean	.21	1.54	.19	.31
	SD	.52	4.45	.24	.65
Equal Use of English and an Indian Language	Mean	2.08	1.76	1.70	2.35
	SD	2.38	2.00	1.76	1.46
Predominantly an Indian Language	Mean	1.96	1.69	.71	.90
	SD	2.34	2.30	.81	.89
TOTAL	Mean	1.51	1.65	1.14	.99
	SD	2.17	3.11	1.14	1.20

4C C. LANGUAGE OF INSTRUCTION

A significant factor in instruction of Indian students is the language that is used in providing academic instruction in subjects other than Indian language arts. Table 4.6 presents the average, across students, of the percentage of English use for instruction in the various subject areas. As the table indicates, the amount of Indian language versus English language use in instruction varies somewhat from subject to subject. As might be expected, the Indian language was used least for instruction in English language arts and used to the greatest extent for instruction in ethnic heritage.

When the data were analyzed at the project level the same pattern was true. Project means indicate that there was 0% to 17% use of the students' Indian language in reading and in other language arts, presumably for explanation and clarification of instruction.

4D D. SERVICE CLUSTERS

The specific types and amounts of instructional services provided to Indian students were described previously, but individual students almost never receive only one instructional service. Rather, a student is provided with a set of services, here referred to as a "service cluster." A service cluster is defined as a set of instructional services provided to a particular student at a particular period of time. Table 4.7 shows the 6 service clusters together with the subcategories (a total of 32 clusters altogether) and the values of the instructional variables associated with each cluster type. The six major clusters are defined as follows:

Cluster A: Involves "heavy use of the Indian language" for instruction; that is, use of the Indian language rather than English more than 87.5% of the time.

Cluster B: Involves "moderate use of the Indian language" for instruction; that is, use of the Indian language between 37.5% and 87.5% of the time.

TABLE 4.6. Mean percentage use of English for instruction of Indian students in academic subjects[a]

Subjects:	Grade 1 Percentage	Grade 1 No. of Cases	Grade 3 Percentage	Grade 3 No. of Cases
Regular English[b]				
Reading	93%	624	91%	567
Other	92	645	91	581
Special English[b]				
Oral English	88	465	86	330
Other	82	537	76	223
Mathematics	88	665	89	587
Science	86	656	87	540
Social Studies	87	645	89	549
Ethnic Heritage	62	708	53	345

[a] The means are based on all students for whom data were obtained; when students did not receive instruction in a particular subject area, a value of zero hours was included in the mean.

[b] "Regular English" refers to the English instruction provided to monolingual English-speaking students and to other students who are proficient in English. "Special English" refers to an instructional program, such as ESL, that utilizes materials and methods especially designed for teaching English to LM-LEP students.

Cluster Variable / Cluster Type	Extent of Indian Language Use in Non-language arts instruction[a]	Special Instruction in English Provided	The English used in instruction is primarily[b] simplified English:		Instruction in Indian Language Arts
			in teaching of non-language arts[a]	in teaching of English	
A. Instruction Primarily Using Indian Language	High use of the Indian language (Over 87.5%)				
A1		*	*	Yes	Yes
A2		*	*	No	Yes
A3		*	*	Yes	No
A4		*	*	No	No
B. Instruction using Both Indian and English Languages Extensively	Moderate use of the Indian lang. (37.5%-87.5%)				
B1		*	Yes	Yes	Yes
B2		*	Yes	No	Yes
B3		*	No	Yes	Yes
B4		*	No	No	Yes
B5		*	Yes	Yes	No
B6		*	Yes	No	No
B7		*	No	Yes	No
B8		*	No	No	No
C. Emphasis on English, with Some Instruction Using Indian Language	Low use of the Indian language (75%-37.499%)				
C1		*	Yes	Yes	Yes
C2		*	Yes	No	Yes
C3		*	No	Yes	Yes
C4		*	No	No	Yes
C5		*	Yes	Yes	No
C6		*	Yes	No	No
C7		*	No	Yes	No
C8		*	No	No	No
D. Instruction Using English, with Special Instruction in English	Minimal or no use of the Indian language (Less than 7.5%)				
D1		Yes	Yes	Yes	Yes
D2		Yes	Yes	No	Yes
D3		Yes	No	Yes	Yes
D4		Yes	No	No	Yes
D5		Yes	Yes	Yes	No
D6		Yes	Yes	No	No
D7		Yes	No	Yes	No
D8		Yes	No	No	No
E. Instruction Using English, with No Special Instruction in English	Minimal or no use of the Indian language (Less than 7.5%)				
E1		No	Yes in at least one column		Yes
E2		No	No	No	Yes
E3		No	Yes in at least one column		No
F. All Instruction in English, with No Special LEP Service	Minimal or no use of the Indian language (Less than 7.5%)	No	No	No	No

[a] Non-language arts instruction includes Math, Science, and Social Studies (including Ethnic Heritage).

[b] Over 50 percent.

*May or may not occur.

Cluster C:	Involves "low use of the Indian language" for instruction; that is, use of the Indian language between 7.5% and 37.4% of the time.
Cluster D:	Involves "minimal or no use of the Indian language"; that is, use of the Indian language less than 7.5% of the time. However, special instruction in English language arts is provided.
Cluster E:	Also involves "minimal or no use of the Indian language"; that is, use of the Indian language less than 7.5% of the time. No special instruction in English language arts is provided but some special instructional accommodations are made for limited-English-proficient students.
Cluster F:	Also involves "minimal or no use of the Indian language"; that is, use of the Indian language less than 7.5% of the time. Furthermore, no special instruction in English language arts nor any other special instructional accommodations are provided for limited-English-proficient students.

Tables 4.8a and 4.8b present the overall cluster distribution for first-grade and third-grade Indian students. There were no Indian students in the major cluster A for either the first grade or the third grade. The greatest proportion of Indian students in both first and third grades was found in major cluster C which involves low use of the Indian language. The distribution of students among clusters B, D, and clusters E and F, was also much the same for first and third graders. The percentage in cluster F, however, increases substantially between grades 1 and 3. Table 4.9 presents the cluster distribution within each of the Title VII projects.

When the data were analyzed in terms of the extent to which an Indian language is used in project communities, reasonably expected results were found (see Table 4.10). In communities where an Indian language was predominant, 73% of the first-graders and 86% of the third-graders were in clusters B or C, whereas in communities where English was predominant, no students in either grade were in clusters B or C. In communities where there was an approximately equal use of English and an Indian language, 78% of the first-graders and 56% of the third-graders were in B or C clusters, indicating that the extent of Indian language used during instruction declined.

TABLE 4.8a. Distribution of service clusters for Indian students: Major Clusters

	Grade 1		Grade 3	
Service Cluster*	No. of Cases	Percentage	No. of Cases	Percentage
Cluster B: (Between 37.5% and 87.5% use of Indian language)	107	16.1%	80	13.6%
Cluster C: (Between 7.5% and 37.4% use of Indian language)	257	38.6	216	36.8
Cluster D: (Less than 7.5% use of Indian language plus special instruction in English)	183	27.5	117	19.9
Cluster E: (Less than 7.5% use of Indian language plus some special accommodation for LEP students)	34	5.2	40	6.8
Cluster F: (Less than 7.5% use of Indian language with no special English instruction or other accommodation for LEP students)	84	12.6	134	22.8
Total	665	100.0%	587	100.0%**

*No Indian students were in Cluster A.

**Percentages do not add to 100.0% because of rounding error.

TABLE 4.8b. Distribution of service clusters for Indian students: full set of clusters

Cluster Type*	Grade 1		Grade 3	
	No. of Cases	Percentage	No. of Cases	Percentage
B1	16	2.4%	36	6.1%
B2	44	6.6	20	3.4
B3	—	—	—	—
B4	7	1.1	8	1.4
B5	31	4.7	8	1.4
B6	—	—	2	0.3
B7	—	—	—	—
B8	9	1.4	6	1.0
Total Bs	107	16.2	80	13.6
C1	31	4.7	—	—
C2	21	3.2	28	4.8
C3	39	5.9	12	2.0
C4	122	18.3	102	17.4
C5	6	0.9	4	0.7
C6	—	—	25	4.3
C7	24	3.6	—	—
C8	14	2.1	45	7.7
Total Cs	257	38.7	216	36.9
D1	—	—	—	—
D2	—	—	—	—
D3	1	0.2	2	0.3
D4	28	4.2	34	5.8
D5	33	5.0	1	0.2
D6	17	2.6	9	1.5
D7	24	3.6	2	0.3
D8	80	12.0	69	11.8
Total Ds	183	27.5	117	19.9
E1	3	0.5	—	—
E2	17	2.6	36	6.1
E3	14	2.1	4	0.7
Total Es	34	5.2	40	6.8
Fs	84	12.6	134	22.8
Total**	665	100.0%	587	100.0%

*No Indian students were in any of the four Cluster A types.
**Totals do not add to 100% due to rounding error.

TABLE 4.9. Percentage of students in service clusters by Title VII project

Project	Grade 1							Grade 3						
	N	Cluster					Not Clustered*	N	Cluster					Not Clustered*
		B	C	D	E	F			B	C	D	E	F	
1	22	100%	0%	0%	0%	0%	0%	0	-	-	-	-	-	-
2	68	3	66	1	0	0	29	55	2%	94%	0%	0%	0%	4%
3	24	4	96	0	0	0	0	26	0	100	0	0	0	0
4	11	0	91	0	9	0	0	9	89	11	0	0	0	0
5	175	13	48	0	0	0	40	101	0	69	0	0	0	31
6	49	51	14	8	27	0	0	32	66	0	6	3	22	3
7	23	0	0	0	0	0	100	19	63	16	21	0	0	0
8	57	26	35	39	0	0	0	60	42	53	0	0	0	0
9	34	0	59	6	35	0	0	27	4	0	14	7	74	0
10	30	17	34	6	13	30	0	23	0	48	4	0	43	4
11a	8	0	0	0	0	0	100	19	0	0	84	0	0	16
11b	6	0	100	0	0	0	0	6	0	100	0	0	0	0
12	21	71	0	0	0	29	0	27	0	11	19	4	67	0
13	45	0	0	98	0	0	2	37	0	0	95	0	0	5
14	13	0	0	0	0	92	8	15	0	0	60	0	0	40
15	9	0	0	0	0	100	0	13	0	0	0	0	100	0
16	25	0	100	0	0	0	0	13	0	0	0	100	0	0
17	16	0	0	100	0	0	0	11	0	0	0	100	0	0
18	23	0	0	87	0	13	0	20	0	0	60	0	40	0
19	33	0	0	6	0	94	0	35	0	0	23	20	54	3
20	34	0	0	71	0	29	0	26	0	0	15	46	38	0
21	15	0	0	47	27	27	0	23	0	0	43	17	39	0
22	39	0	0	100	0	0	0	32	38	9	50	0	0	3
23	8	0	100	0	0	0	0	6	0	100	0	0	0	0

*Students on whom data were obtained but whose data were inconsistent or incomplete.

TABLE 4.10. Percentage distributions of service clusters for students in communities with different language use patterns

Predominant Language	Service Clusters*				
	B	C	D	E	F
Grade 1					
Indian language is predominant (N=270)	25.2%	47.4%	22.2%	1.1%	4.1%
English and the Indian language are about equal (N=147)	16.3	61.9	4.1	17.9	0
English is predominant (N=148)	0	0	77.8	3.2	19.1
Grade 3					
Indian language is predominant (N=242)	17.4	68.2	9.1	0.1	5.0
English and the Indian language are about equal (N=107)	27.1	29.0	5.6	14.0	24.3
English is predominant (N=111)	0	0	47.8	12.6	39.6

* The Service Clusters may be characterized as follows: B - Instruction using both Indian and English languages extensively; C - Emphasis on English, with some instruction using the Indian language; D - Instruction using English, with special instruction in English; E - Instruction using English, with no special instruction in English; and F - All instruction in English, with no special LEP services.

Table 4.11 provides a comparison of the distribution of service clusters for Indian students with data from the first year of the LM-LEP Study. The LM-LEP comparison data are for the spring data collection. These were chosen as the most comparable to the Indian student data, also collected in the spring.

Looking first at the major cluster distributions, it is clear there are some significant differences in the Indian student distributions compared to the national LM-LEP distributions for both first and third grade. No Indian students in either grade were in major cluster A while 14.1% of LM-LEP first-graders and 1.5% of LM-LEP third-graders were. Basically that indicates that no Indian sites involved heavy use of the Indian language while a small, but significant, portion LM-LEP sites used the native language heavily with first grade students. A few LM-LEP sites even used the native language heavily with third grade students.

Indian students in both grades were more likely to be found in major cluster C than were LM-LEP students nationally. Again the difference was less pronounced for third graders than for first graders.

A greater portion of Indian first graders were found in major cluster D than were LM-LEP first graders. However, the reverse is true for third grade; a smaller portion of Indian students were found in major cluster D than were LM-LEP third graders.

Indian and LM-LEP students showed about the same proportion of first graders in major cluster E. In third grade, more LM-LEP than Indian students were in major cluster E.

About twice the portion of Indian first graders were in major cluster F as were LM-LEP first graders (12.6% versus 6.4%). The same pattern was also found for third grade (22.8% of Indian students versus 12.3% of LM-LEP students).

TABLE 4.11. Distribution of service clusters for Indian students compared with LM-LEP students nationally*

Service Cluster**	Grade 1				Grade 3			
	Indians		LM-LEPs		Indians		LM-LEPs	
	N	%	N	%	N	%	N	%
Cluster A:	0	—	587	14.1%	0	--	47	1.5%
Cluster B:	107	16.1%	1154	27.8%	80	13.6%	628	19.4%
Cluster C:	257	38.6%	1047	25.2%	216	36.8%	993	30.7%
Cluster D:	183	27.5%	897	21.6%	117	19.9%	831	25.7%
Cluster E:	34	5.2%	202	4.9%	40	6.8%	340	10.5%
Cluster F:	84	12.6%	266	6.4%	134	22.8%	399	12.3%
TOTAL	665	100.0%	4153	100.0%	587	100.0%	3238	100.0%

*Data for LM-LEP students are taken from Young et al. (1986), Chapter 7, Tables 7.3 and 7.4 -- spring 1985 cluster distributions.

**No Indian students were in any of the four A cluster types.

4E E. INSTRUCTIONAL MATERIALS

In addition to the language used for presenting instruction and the other factors entering into the definitions of the various service clusters, the specific types of materials used as the basis of instruction are also significant aspects of the instruction provided to students. The content of classroom instruction depends substantially on the particular reader, textbook, or workbook selected for use (Duffy & MacIntyre, 1982; Durkin, 1981; Freeman et al., 1983), and the amount of content that is learned by the students may be affected to an important degree by the accessibility of that content in terms of the student's own experience with language and with culture (Galliland, 1986). Thus two central characteristics of the instructional materials used by Indian students are the language in which the materials are written and the extent to which the materials are relevant to the students' linguistic and cultural knowledge.

The Indian students within this study represent a range of circumstances with regard to the use of an Indian language, and consequently the use of Indian language materials may serve different functions depending on the students' background. The data shown in Tables 4.12 indicate that very few of the teachers reported using only Indian language materials; the teachers responding in this case were the students' main teachers; i.e., those teachers who were the students' only or the primary teacher for academic subjects. Overall, about 11% of the main teachers of students in grade 1 and about 17% of the main teachers of students in grade 3 reported use of Indian language materials, either alone or in combination with English language materials.

LEP students are also assisted in their comprehension and learning of academic content when the materials used are designed specifically for students who are not native speakers of English. These materials may include the use of English syntax that is adapted to the level of ability of the LEP students, and they may also include content that is modified to reflect the differing cultural experience of the LEP students. Table 4.12 includes data on the use of English language materials that have been specially designed for LEP students; these data are shown in the table as category C.

Transition into a regular curriculum may be smoother when there is a link between the materials used for LEP students and the materials used for EP students. The categories A and B of Table 4.12 indicate use of materials related to the EP curriculum. These data show that the majority of main teachers in both grade 1 and grade 3 indicate the use of materials for LEP students which are the same as those used for EP students.

TABLE 4.12. Percentage of main teachers who report the use of specific types of materials

Single Type of Materials:	Grade 1	Grade 3
A. LEP and EP materials are the same	79.1%	74.3%
B. Indian language version of EP materials	2.3	8.6
C. English materials designed for LEP students	4.7	8.6
D. Indian language materials not related to EP materials	2.3	0.0
Combinations of Materials:		
A and C (English language materials)	4.7	0.0
B and D (Indian language materials)	0.0	0.0
Combination of English and Indian language materials		
A and D	2.3	8.6
Other	4.6	0.0
TOTAL	100.0%	100.0%
No. of Cases	43	35

Teachers also indicated the extent to which classroom materials were relevant to their Indian students' cultural experience. These data are presented in Table 4.13. Approximately 75% of the main teachers of grade 1 students and approximately 60% of the main teachers of grade 3 students report at least some use of materials that are relevant to their Indian LEP students' cultural experience. For auxiliary teachers, defined as those teachers who are not the students' primary teacher and who independently provide instruction in academic subjects, the parallel percentage was approximately 76%, while for support staff, those who assist in academic instruction under supervision of a teacher, the percentage was about 49%.

Because there are very few commercially available materials designed for Indian students of the various tribal and linguistic backgrounds, data were obtained indicating the extent to which local, teacher-developed materials were used in the classroom. These data, presented in Table 4.14, show that all of the main teachers of grade 1 students prepare at least some of the materials used in their classes and that about one-fifth of these teachers prepare most of the materials used. Main teachers of grade 3 students reported use of teacher-developed materials to a somewhat lesser extent than did main grade 1 teachers; however, all but about 12% of these teachers reported at least some use of teacher-developed materials. About a quarter of the auxiliary and support teachers reported that most or all of the materials used in their instruction were teacher-developed.

TABLE 4.13. Percentage of teachers* who report use of materials relevant to Indian LEP students' cultural experience

	All Materials	Half /or More of Materials	Some, But Less than Half of Materials	None of Materials	No.of Cases
Main teacher-Grade 1	0.0%	12.8%	61.7%	25.5%	47
Main teacher-Grade 3	11.1	5.6	44.4	38.9	36
Auxiliary teacher	3.9	15.7	56.9	23.5	51
Support staff	8.5	6.8	33.9	50.8	59

*Teachers who were independently responsible for the instruction of the study students were defined as either "main" or "auxiliary" teachers. Main teachers were the students' sole or primary teachers for academic subjects within any instructional day; auxiliary teachers taught the students only part of a day. Persons who taught the students only under the supervision of another teacher or at the direction of another teacher were defined as "support staff."

TABLE 4.14. Percentage of teachers* who report use of teacher-developed materials

	Percentage of teachers reporting levels of use of teacher-developed materials				
	All	Most	Some	None	No. of Cases
Main teacher-Grade 1	0.0%	21.7%	78.3%	0.0%	46
Main teacher-Grade 3	0.0	17.6	70.6	11.8	34
Auxiliary teacher	5.9	21.6	58.8	13.7	51
Support staff	5.2	20.7	53.4	20.7	58

*Teachers who were independently responsible for the instruction of the study students were defined as either "main" or "auxiliary" teachers. Main teachers were the students' sole or primary teachers for academic subjects within any instructional day; auxiliary teachers taught the students only part of a day. Persons who taught the students only under the supervision of another teacher or at the direction of another teacher were defined as "support staff."

4F F. INSTRUCTIONAL ORGANIZATION

The nature of the instruction provided to students is determined not only by the content of that instruction and the materials used to present that content but also to a great extent by the structure of the instruction; i.e., the organization of the classroom learning activities (Galliland, 1986). Instructional organization can refer to the number of persons who provide instruction to the students (e.g., single teacher, teacher plus aide) and to the types of groupings used for instruction (e.g., whole class, small group).

Teachers of the students in this study reported whether they "worked directly with" any paid classroom aides or with any unpaid classroom volunteers. The responses of the grade 1 and grade 3 teachers are summarized in the data in Table 4.15. The majority of main teachers and of auxiliary teachers reported working with aides while close to a quarter of the support teachers overall also reported working with aides. In the case of the support teachers, the data most likely include cases in which the teacher is working together with another aide rather than supervising that aide. As shown in the second half of the table, the use of unpaid volunteers is reported much less frequently.

TABLE 4.15. Percentage of teachers who report that they work directly with aides or volunteers

	Main Teacher Grade 1		Main Teacher Grade 3		Auxiliary		Support	
	%	No. of Cases	%	No. of Cases	%	No. of Cases	%	No. of Cases
Use of Aide	79.2%	48	68.2%	44	57.4%	54	23.7%	59
Use of Volunteer	14.6	48	16.7	42	1.9	54	1.7	60

*Teachers who were independently responsible for the instruction of the study students were defined as either "main" or "auxiliary" teachers. Main teachers were the students' sole or primary teachers for academic subjects within any instructional day; auxiliary teachers taught the students only part of a day. Persons who taught the students only under the supervision of another teacher or at the direction of another teacher were defined as "support staff."

Research on the academic achievement of minority LEP students has given further evidence that the type of organization of the classroom for instructional activities plays a role in determining how well students will learn. For example, studies (Gallimore, 1981; Lucker, Rosenfield, Sikes & Aronson, 1976) have found higher academic achievement within small group instructional settings. However, effective instructional settings may differ depending on the cultural background of the students; for example, Fillmore (1985) found that while small group instruction was associated with higher achievement for Hispanic students, whole class instruction appeared to be a more effective structure for use with Chinese students. Thus, while there is no one type of classroom organization for instruction that is effective for all groups, it is clear that the type of organization used is an important factor in describing the nature of the instruction provided to students.

Table 4.16. presents data on the mean percentage use of four different types of classroom organization: whole class, small group, individual instruction, and independent work. The table is based on teachers' reports of the average proportion of their instructional time spent within each organizational type. These data indicate that there are some differences by grade in the proportion of time allocated to the four different classroom organizations but that these differences tend to be rather small. More important is the diversity of approaches. As Galliland (1986, p.6) notes, "each child must be evaluated individually, and group instruction must be through an eclectic learning experience in which each can learn his or her own way." The use of different classroom organizations by teachers is one indication of such an eclectic approach.

TABLE 4.16. Mean percentage use of specific classroom organizations as reported by main and auxiliary teachers

	Whole Class	Small Group	Individual Instruction	Independent Work	No. of Cases
Main teacher Grade 1	28.6%	37.3%	17.0%	17.1%	47
Main teacher Grade 3	34.7	23.4	18.7	23.2	43
Auxiliary teacher	20.8	31.1	21.0	27.1	50

4G

G. CHARACTERISTICS OF INSTRUCTIONAL STAFF

Perhaps as important as a student's instructional program are the characteristics of the student's teachers. The teachers' background, philosophy, and experience play large roles in shaping the teacher-student interactions within the classroom and in defining the nature of the instructional activities. Several different aspects of the teachers' characteristics were examined in this study, including their certification and education, years of experience, and background in English and in an Indian language.

In the Staff Questionnaires administered during site visits, teachers indicated the highest academic degree which they had earned. As shown in Table 4.17, the majority of the responding teachers (63%) had at least a bachelor's degree, and a significant proportion (29%) had earned a master's degree as well. None of the teachers reported having earned a doctoral degree.

TABLE 4.17. Highest academic degree earned by teachers

	No. of Teachers	Percent
Associates degree	12	8%
Bachelor's degree	99	63
Master's degree	46	29
TOTAL	157	100%

Teachers develop expertise in the instruction and management of their students not only through education but also to a large extent through years of working in the classroom. Table 4.18 presents data on the number of years of experience of the teachers in working with grade K-6 students and in working with Indian LEP students in these grades in particular. These data indicate that there are some differences in mean years of experience by grade level. The range in number of years of experience was reported as between 1 and 39 years for working with grades K-6 in general, and between 1 and 31 years for working with Indian students in grades K-6.

TABLE 4.18. Mean years of teaching experience reported by main, auxiliary, and support teachers*

	Main 1		Main 3		Auxiliary		Support Staff	
	Mean	No. of Cases	Mean	No. of Cases	Mean	No. of Cases	Mean	No. of Cases
Years Teaching Grades K-6	12.2	48	9.5	43	7.6	53	7.6	64
Years Teaching Indian LEPs in Grades K-6	8.1	42	6.6	35	6.3	49	6.8	58

*See Table 4.15 for definition of teacher categories.

Recognition and assurance that teachers have received education and training to prepare them for their work in the classroom is provided through state credentials and university certificates. On the Staff Questionnaires, teachers indicated whether they held such credentials or certificates and the type of certification held. Table 4.19 presents data showing the proportion of teachers of each ethnicity group who reported holding some type of certification. Most main teachers held state credentials or university certificates in education. Support teachers frequently reported no credentials or certificates.

Since the students in this study were Indian LEP students, it is of further interest to ask whether their teachers had received any special certification related to the educational needs of LEP students. The data in Table 4.19 also indicate that generally teachers did not report holding credentials or certificates in either Bilingual Education or English-as-a-Second-Language instruction. For the most part, such certification was only reported by the auxiliary or support teachers and not by any main teachers.

TABLE 4.19. Teachers* holding state credentials/ university certificates

	Main 1		Main 3		Auxiliary		Support	
	Percentage	No. of Cases	Percentage	No. of Cases	Percentage	No. of Cases	Percentage	No. of Cases
Teacher Certification	96.0%	48	100.0%	44	80.4%	51	50.9%	53
Certified in Bilingual Education or ESL	4.2%	48	2.3%	44	9.8%	51	5.7%	53

*See Table 4.15 for definition of teacher categories.

Teachers are further assisted in their development as effective teachers of LEP students through special college coursework and through any special in-service or preservice training provided by the schools in which they work. On the Staff Questionnaires, the teachers indicated whether they had taken college-level courses or received recent (within the past three years) preservice or inservice sessions within areas related to the instruction of Indian students. These areas were:

- Teaching the language arts of the Indian language to Indian LEP students;
- Teaching math, science, or social studies in the Indian language to Indian LEP students;
- Teaching history, culture, or ethnic studies associated with the background of Indian LEP students;
- Teaching English-as-a-Second-Language;
- Teaching math, science, or social studies in English to Indian LEP students.

In Table 4.20, the proportion of main, auxiliary, and support teachers who had taken coursework or received preservice/inservice related to the instruction of Indian LEP students are presented.

TABLE 4.20. Percentage of teachers* who report having taken college coursework or preservice/inservice related to the academic instruction of Indian LEP students

	Percentage of teachers		
	College Coursework	Recent Inservice/ Preservice	No. of Cases
Grade 1 Main Teachers	56.3%	45.8%	48
Grade 3 Main Teachers	50.0	38.6	44
Auxiliary Teachers	57.4	31.5	54
Support Staff	43.1	21.5	65

*See Table 4.15 for definition of teacher categories.

Studies concerned with the education of language minority students have reported that instruction is generally more effective in promoting the academic achievement of students when it is presented by a person who is familiar with aspects of the students' cultural background (Au & Mason, 1981). Special education courses or inservice sessions can provide some of this familiarity with the students' cultural and linguistic backgrounds. Membership in the same cultural group as the students ensures familiarity with the students' patterns of participation in the classroom activities and assists the teacher in structuring instructional activities that are most consistent with the students' preferred style of learning.

In Table 4.21, the proportion of teachers reporting membership in a Native American group are presented for each type of teacher. A member of a Native American group was defined as any individual who is a member of, or who is eligible for membership in, a federal, state, or locally recognized Indian tribe or an Alaska Native Village, or who is recognized by the local community as being of American Indian or Alaska Native descent.

TABLE 4.21. Percentage of teachers* reporting membership in a Native American group

Main 1		Main 3		Auxiliary		Support	
%	No. of Cases	%	No. of Cases	%	No. of Cases	%	No. of Cases
41.7%	48	40.9%	44	51.9%	52	65.6%	64

*See Table 4.15 for definition of teacher categories.

An important objective of special services for Indian LEP students is the development of the English language skills of the students. In order to successfully achieve this objective, the teachers providing English language instruction to the students should themselves be proficient in English. Teachers who are proficient in English provide role models for the students, particularly if the teachers are also speakers of the students' Indian language.

When special services involve the use of the Indian language in instruction or instruction in the language arts of the Indian language, it is important that the teachers also be sufficiently proficient in the Indian language. However, even if special services do not involve use of the Indian language, the teacher's knowledge of the language can assist him or her in understanding the students' errors in English.

Teachers were asked to describe their experience in English and in an Indian language by indicating if the language were: (1) their native language; (2) a language used extensively since childhood; (3) the language of instruction for their elementary or secondary education; (4) the language of instruction for college and university studies; and/or (5) a language studied as a foreign language in school. Based on the responses, a measure of background in English and a measure of background in an Indian language was developed for each teacher by assigning a value of 1 to each of the above statements which the teachers selected as describing their experience in the language. These responses were then summed to obtain the value representing extent of background in the language. For example, a value of 4 for background in English would be assigned to teachers who indicated that English was their native language, that it was a language they had used extensively since childhood, and that English was the language of instruction for elementary, secondary and college education. Non-native speakers of English who had received college instruction in English and who studied English as a foreign language would receive a total of 2 on the English language background measure. The possible scores on each language ranged from 0-4 since, if the teacher indicated that the language had been used extensively since childhood or indicated that it was the language of instruction for elementary and secondary education, then it was not possible to also indicate that the language was studied as a foreign language in school.

A measure of Indian-language background was similarly obtained for each teacher, provided that the specific Indian language reported by the teacher matched a language spoken within the study site in which the teacher worked. If there were no match, then the teacher was rated as having a 0 for background in an Indian language; that is, the Indian-language measure was specific to the language expected to be spoken by the students.

The data on English-language background and on background in an Indian language are reported in Table 4.22. The means shown for English language background in Table 4.22 demonstrate that, overall, teachers had a strong background in the language. In general, however, main teachers showed higher mean ratings for English-language background than did auxiliary and support teachers.

The mean ratings for background in the Indian language were low. The means for the auxiliary and support staff, while quite low, are higher than the mean ratings reported by the main teachers.

TABLE 4.22. Mean English and mean Indian language background rating* of main, auxiliary, and support teachers

	Main 1		Main 3		Auxiliary		Support	
	Mean	No. of Cases	Mean	No. of Cases	Mean	No. of Cases	Mean	No. of Cases
English	3.6	48	3.7	44	3.1	54	2.9	62
Indian language	.6	47	.4	44	.9	54	1.0	65

*The rating of background in use of English and of the Indian language is based on the sum of the teachers' responses regarding use of the language. A value of one (1) was assigned to each of the following: a) the language is the individual's native language; b) the language has been used extensively since childhood; c) it was the language of instruction for the individual's elementary or secondary education; d) it was the language of instruction for the individual's college/university studies; (e) the individual studied this language as a foreign language in school. The possible scores ranged from 0-4 since, if (b) or (c) were selected, it was not possible to also select (e).

Chapter 5. CHARACTERISTICS AND ACADEMIC ACHIEVEMENT OF INDIAN STUDENTS[1]

Whereas the focus of Chapter 4 was on the instruction provided to Indian students in schools served by Title VII projects, this chapter is focused on the characteristics of Indian students and their academic achievement. The chapter is organized into three major sections: A. Characteristics of Indian Students; B. Student Performance on English and Mathematics Achievement Tests; C. Correlates of Student Performance. Major findings discussed in this chapter are summarized below.

SUMMARY OF MAJOR FINDINGS

The students in the visited schools came from 16 different tribal groups and spoke 18 different Indian languages. According to parents, 85% of the students were born in extremely remote areas of the country -- on or near a reservation, rancheria, or pueblo -- while 14% were born elsewhere in the United States. The mean age for first grade students, as of January 15, 1986, was 6.89 years and for third graders 9.01 years. These are in the range of ages one would expect for first and third grade students.

Of the students in the study, 78% had been classified by their school district as LEP, and 22% had never been formally classified as such. In the case of 90% of the LEP students, the classification was made when they were in kindergarten. Data from the study's measure of oral language proficiency, the Student Oral Proficiency Rating form, revealed that grade 3 students were generally rated at higher levels of oral proficiency in English than were grade 1 students. Higher ratings of proficiency in the Indian language were also found for grade 3 students overall than for grade 1 students.

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[1] Abbreviations and other special terms used in this study are defined in the glossary in Appendix B.

On the Raven Progressive Matrices, a measure of academic aptitude, Indian children scored at about the same level as the non-Indian English-proficient students in the LM-LEP study and higher than the LM-LEP students in that study.

Comparison of the Stanford Achievement Test (SAT) scores for students in this study with the same data on students in the LM-LEP Study revealed that the Indian students scored somewhat higher on Vocabulary and Reading Comprehension than the LM-LEP students but slightly lower in math. A comparison of Indian students' SAT scores with national norms indicates that the Indian students scored systematically below the national norms. Their means in both grade 1 and grade 3 were in the vicinity of the 25th percentile, the range being from the 21st percentile (for Concepts of Number, grade 1) to the 31st percentile (same test, grade 3). The low means appear to be due, in part, to the limited English proficiency of the children. Evidence for this lies in the strong relationship between whether English or an Indian language is the predominant language in the community and the corresponding project's means on the SAT variables. Further evidence lies in the fact that the higher a student's English SOPR, the higher the student's SAT scores are likely to be. However, across all subtests at both grades, the means of even the most English-proficient students are well below the 50th percentile in terms of national norms.

The SAT Vocabulary subtest score shows the highest correlations with three home-and-family variables: socioeconomic status, parental education, and the degree to which parents use English in the home. Of the three, parents' use of English is the one that is most closely related to SAT scores in general, but its importance diminishes as the students advance from grade 1 to grade 3, during which time, presumably, children whose knowledge of English was weak in grade 1 gain proficiency in the language. A community variable, the extent to which English is used in the community, has even higher grade 1 correlations with SAT scores than does parental use of English, but these correlations, too, tend to decline by grade 3.

Analyses of the relation between instructional variables and SAT scores produced substantial negative correlations between SAT scores and such variables as hours per week of special English instruction, percentage of use of simplified English, and percentage of use of the Indian language in instruction. This suggests that the special services designed to help LEP children are being directed to those children who are most in need.

The overall finding that the Indians' mean SAT scores are very low is somewhat at variance with results obtained in the national evaluation of Part A of the Indian Education Act (Young, et al., 1983). In that study Indian students were found to score only slightly below the norms populations for the Reading and Math subtests. The difference in the findings from the two studies is probably due largely to the fact that the earlier study included a large number of Indians living in non-reservation areas who were more integrated into non-Indian society while the sample for the present study consists exclusively of students on or near reservations. These students, thus, are not only less proficient in English than those in the earlier study but they are also more isolated, and thus subject to whatever disadvantages isolation brings.

The data from the current study strongly suggest that Indian students in rural schools on or near reservations have serious educational problems. The data show that although these students have academic aptitudes in the average range or slightly above, they perform very poorly on standardized achievement tests. While it was beyond the scope of this study to perform a comprehensive assessment of the schools these students attend, it would seem an appropriate undertaking.

5A A. CHARACTERISTICS OF INDIAN STUDENTS

The purpose of this section is to describe the students in the study in terms of certain variables which are expected to affect their acquisition of English and their ability to function successfully academically. Data on such factors as age, place of birth, prior educational experience, oral language proficiency in English and in an Indian language, and academic aptitude are presented and discussed.

5A.1 DEMOGRAPHIC CHARACTERISTICS

a. Language Background

Elementary school students from 25 different Native American language backgrounds were served by the 56 Title VII projects funded for 1985-86. As shown in Tables 5.1 and 5.2, the students in the 32 visited schools in the 23 visited projects came from 16 different tribal groups and had 18 different native language backgrounds.

b. Place of Birth

According to surveyed parents, 85% of the students were born in extremely remote areas of the country -- on or near a reservation, rancheria, or pueblo -- while 14% were born elsewhere in the United States, and 1% were born in a country other than the United States. Residence on or near a reservation is an important variable in understanding Indian students' academic performance because of the important cultural and linguistic influences on Indian children of life on the reservation. Most reservations were located in remote areas and reservation life has acted to preserve traditional Indian culture and values as well as Indian languages. While events since the late 19th century have resulted in increased interaction between reservation communities and the world outside, many of these communities remain centers of traditional Indian culture. Thus, students who were born on or near a reservation may be expected to have had greater exposure to the local Indian language and to non-standard English and less exposure to standard English than children born elsewhere in the United States.

TABLE 5.1. Number of students in the sample by tribal group

Tribal group	Number of Students	Percentage
1. Navajo	665	43.0%
2. Cherokee	142	9.2
3. Crow	115	7.4
4. Mitchif (Metis)	110	7.1
5. Apache	90	5.8
6. Choctaw	73	4.7
7. Acoma	64	4.1
8. Passamaquoddy	64	4.1
9. Hualapai	50	3.2
10. Ojibwa (Chippewa)	39	2.5
11. Oglala (Lakota)	38	2.5
12. Gros Ventre (Atsina)	27	1.7
13. Arikara	23	1.5
14. Papago (O'odham)	20	1.3
15. Havasupai	14	.9
16. Assiniboine	12	.8
TOTAL	1,546	100.0%

TABLE 5.2. Number of students in the sample by native language

Language	Number of Students	Percentage
1. Navajo	617	39.9%
2. English	396	25.7
3. Crow	114	7.4
4. Apache	84	5.4
5. Choctaw	74	4.8
6. Passamaquoddy	57	3.7
7. Hualapai	44	2.9
8. Lakota	37	2.4
9. Atsina (Gros Ventre)	22	1.4
10. Ojibwa (Chippewa)	22	1.4
11. Cherokee	18	1.2
12. Havasupai	16	1.0
13. Papago (O'odham)	16	1.0
14. Assiniboine	13	.8
15. Keres	11	.7
16. Arikara	2	--
17. Comanche	2	--
18. Dakota	1	--
TOTAL	1,546	100.0%

c. Mobility

The first graders in the study had been at their current schools for an average of 1.07 years (SD .50) and third graders had been at their current schools for an average of 2.66 years (SD 1.06). Thus, for most of the students in the study, their current school was the only school they had ever attended. This is an indication that mobility of these students is low and, thus, that nearly all have lived all of their lives in a reservation environment.

This is particularly the case for students from more culturally traditional Indian communities. As shown on Table 5.3, analyses in terms of the extent to which an Indian language was used in the community indicated that, for both first and third graders, the students in communities where English was predominant had been enrolled in their current school less time than students in communities where the Indian language predominated or where the two languages were about equally used.

d. Age

The mean age for first grade students in the study (as of January 15, 1986) was 6.89 years (S.D.=.59) and for third-grade students 9.01 years (S.D.=.70). These are in the range of the ages one would expect for first and third grade students and thus suggest that Indian students are being placed in age-appropriate grade levels.

e. Prior Schooling

A large majority of first-graders (90%) and of third-graders (89%) had attended a summer school program the preceding summer in which instruction was provided in English reading or language arts. In addition, 96% of first-graders and 89% of third-graders had attended kindergarten. Furthermore, 83% of both first and third-graders had been promoted every year to the next grade level. All of the first-grade students who had not been promoted (i.e., who were retained in a grade) had been retained in

TABLE 5.3. Number of years students were enrolled in current school by type of community

Type of Community*		Number of Years Grade 1	Number of Years Grade 3
Predominantly English	Mean	.93	2.42
	SD	.50	1.05
	N	192	193
Equal Use of English and an Indian Language	Mean	1.04	2.72
	SD	.33	1.05
	N	116	95
Predominantly an Indian Language	Mean	1.15	2.84
	SD	.52	1.05
	N	388	226
	F	13.8273	8.6245
	Sig. Level (P)	.0000	.0002

*See Table 3.3 for definitions of the different types of communities.

first grade. For third graders, 33.8% of those who had been retained were retained in first grade; 28.6% were retained in second grade; 39.0% were retained in third grade. None of the students in the study was reported to have "skipped" a grade or advanced more rapidly than other students.

f. Special Education Placements

Very few of the study's students (4%) were in self-contained special education classrooms at the time of the spring data collection. While it was reported that an additional 21.5% of first graders and 27.5% of third graders were receiving some other type of special education instructional services, an analysis of these students' academic aptitude and achievement test scores and discussions with data collection personnel suggest that respondents interpreted this question more broadly than was intended. It appears that they included children in their responses who were receiving compensatory instructional services as well as those receiving services which are more properly labeled special education.

g. School Attendance

Regarding school attendance, first-grade students had been absent from school an average of 5.7 days (SD 5.63) by the time of the spring data collection (April-May), while third-grade students had been absent an average of 4.9 days (SD 5.11).

5A.2 ORAL LANGUAGE PROFICIENCY

a. The Rating Instrument

As noted in Chapter 2, Title VII projects differ substantially in how they determine the LEP status of project participants. To get a uniform measure of English and Indian-language proficiency for students across all projects in the study, arrangements were made for teachers of students in the study sample to complete an instrument entitled the Student Oral Proficiency Rating (SOPR). (See Appendix C, section 8, for a description of this instrument.) In using the SOPR, students were rated by teachers who were proficient in the language being rated, whether English or the Indian language, and who were also familiar with the student's use of that lahguage within a range of classroom situations. Students were rated on a scale of 1 to 5 in five categories of oral proficiency: comprehension, fluency, vocabulary, pronunciation, and grammar. A rating of 1 indicated minimal or no proficiency in that category of language proficiency while a rating of 5 indicated ability equivalent to that of a monolingual speaker of the same age as the student being rated. A total score was calculated by summing the scores for the five individual categories; the total score possible thus ranged from 5 to 25.

The native language group membership of a student was determined through information obtained from school records or persons familiar with the student's background. The options included specific Indian languages in addition to English. When ratings were obtained on proficiency in an Indian language, students who had an Indian native language were rated on that language, and students who had English as a native language were rated on the Indian language associated with their tribal background.

School district personnel in two school districts indicated that there was almost no use at all of an Indian language within the community and that students did not have any opportunity to use the Indian language. For the purposes of the ratings of oral proficiency in the Indian language, all students in these districts were assigned a rating of zero. However, in the analyses to obtain mean SOPR total scores, all of the zero-total scores were recoded to a total score value of "4" to avoid distorting the distribution of the means unnecessarily while still differentiating students with no exposure to the language from those who were individually rated as being at the lowest level of proficiency; i.e., those rated with a total score of 5.[1]

The intercorrelations of the five categories of oral proficiency which were rated on the SOPR are presented in Table 5.4. The correlation coefficients are generally high (ranging from .554 to .961[2]) and support the use of the overall total score for most analyses. It is interesting to note that consistently, across the two language ratings and across the two grade levels, the category of oral comprehension shows a lower

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[1] It is not possible to tell whether there is any real difference in the proficiency of a students receiving a rating of "4" or "5". Individuals receiving a "5" rating had little or no proficiency in an Indian language but may have had some exposure to such a language simply by virtue of the community in which they lived. Those receiving a "4" had no proficiency in an Indian language nor, probably, any exposure to one. Thus, as a group, the "5's" may have had marginally greater proficiency than the "4's", but many individuals rated "5" (indeed, perhaps most) may have been just as lacking as those rated a "4."

[2] Ignoring the correlations with total.

TABLE 5.4. Intercorrelations among SOPR scales separately by grade and language of SOPR rating

ENGLISH SOPR

Grade 1	N	SOPR Scale	Correlation Coefficients				
			Comp.	Fluency	Vocab.	Pronunc.	Grammar
	792	Total	.769	.927	.946	.911	.940
		Comprehension		.752	.628	.554	.602
		Fluency			.835	.773	.816
		Vocabulary				.859	.907
		Pronunciation					.876
		Grammar					-
Grade 3	**N**						
	600	Total	.797	.912	.916	.895	.900
		Comprehension		.763	.618	.585	.590
		Fluency			.794	.737	.742
		Vocabulary				.804	.818
		Pronunciation					.815
		Grammar					-

INDIAN-LANGUAGE SOPR

Grade 1	N	SOPR Scale	Correlation Coefficients				
			Comp.	Fluency	Vocab.	Pronunc.	Grammar
	732	Total	.894	.931	.964	.934	.953
		Comprehension		.847	.828	.809	.819
		Fluency			.897	.819	.856
		Vocabulary				.902	.926
		Pronunciation					.905
		Grammar					-
Grade 3	**N**						
	542	Total	.890	.958	.966	.950	.967
		Comprehension		.875	.815	.811	.816
		Fluency			.915	.877	.908
		Vocabulary				.929	.961
		Pronunciation					.948
		Grammar					-

correlation with the total rating score compared to the other four categories of oral proficiency, particularly for the ratings of English oral proficiency. This suggests that raters made a distinction between the students' ability to speak and their ability to comprehend speech by others.

b. Total SOPR Ratings for Indian Sample in Comparison with National LM-LEP Sample

The means of the total scores on both the English and the Indian-language ratings are compared in Table 5.5 to the means for LM-LEP students nationwide. Looking at just the results for Indian students, both English SOPR total score means and the Indian-language SOPR total score means are higher for grade 3 students than for the grade 1 students. In comparison to LM-LEP students nationwide, Indian students in both first and third grade score higher on the English SOPR and lower on the native language (Indian language) SOPR.

TABLE 5.5. Comparison of mean English and Indian language SOPR total scores for Indian students with mean English and native language SOPR total scores for LM-LEP students nationally*

	English SOPR			Native Language SOPR		
	Mean SOPR Total Score	SD	No. of Cases	Mean SOPR Total Score	SD	No. of Cases
Grade 1						
Indian	18.8	4.96	791	14.8	7.27	730
LM-LEP	14.4	5.94	4612	20.7	5.08	7311
Grade 3						
Indian	20.5	4.19	600	15.9	7.34	542
LM-LEP	16.7	5.31	3568	21.4	4.68	3129

In Table 5.6 the SOPR total scores are broken into five score categories: 5-9 (no proficiency or very limited proficiency in the language; a level at which even simple conversational ability is very poor); 10-14 (limited level of proficiency at which there is some conversational ability given simple topics and given a patient and understanding listener); 15-19 (a level of proficiency at which the person can function in the language, although language use includes errors, lapses in vocabulary, and need for repetition); 20-24 (a generally fluent level of proficiency, although there will be some errors and some lack of vocabulary); 25 (a level of proficiency at which the person cannot be distinguished from a person who is a monolingual native speaker of the language). A sixth category, 0 (no exposure to the language), is also shown for the Indian-language SOPR.

The data in Table 5.6 indicate that grade 3 students were generally rated at higher levels of oral proficiency in English than were grade 1 students. Noteworthy, also, is the fact that the means for students in grade 1 (18.8) and grade 3 (20.5) were in the high ranges of functional ability in English. Higher ratings of proficiency in the Indian language were also found for grade 3 students overall than for grade 1 students.

c. SOPR Ratings By Community Type

In Table 5.7, students' SOPR scores are compared across three community types. As the table shows, a clear and consistent pattern was found. Students had greater proficiency in English and less proficiency in an Indian language in communities where English predominated, and the more extensive the use of the Indian language, the greater the students' proficiency in the Indian language and the lower their proficiency in English.

d. Combined Ratings of English and Indian Language Proficiency

To describe the oral language proficiency background of the students in the study more fully, it is important to consider simultaneously the students' level of proficiency in both English and in the Indian language. Table 5.8 presents the percentage of Indian LEP students within combined

TABLE 5.6. Distribution of English and Indian language SOPR total scores by grade

English SOPR Total Score	Oral Proficiency Level	Grade 1		Grade 3	
		Percentage of Students	No. of Cases	Percentage of Students	No. of Cases
5-9	Very limited or no oral proficiency	5.6%	44	1.8%	11
10-14	Limited oral proficiency	15.3	121	7.3	44
15-19	Functional oral proficiency	27.6	218	22.8	137
20-24	Fluent oral proficiency	34.3	271	45.0	270
25	Native-speaker oral proficiency	17.3	137	23.0	138
Total		100.0%*	791	100.0%*	600
Indian Language SOPR Total Score					
0	No exposure to the language	7.8%	57	7.4%	40
5-9	Very limited or no oral proficiency	21.1	154	16.8	91
10-14	Limited oral proficiency	18.6	136	17.0	92
15-19	Functional oral proficiency	18.1	132	17.9	97
20-24	Fluent oral proficiency	19.0	139	22.0	119
25	Native-speaker oral proficiency	15.3	112	19.0	103
Total		100.0%*	730	[illegible]%*	542

*Totals do not always add to 100% due to rounding error.

TABLE 5.7. Comparison of English and Indian Language Oral Proficiency Scores Across Three Types of Communities

Type of Community		English SOPR		Indian Language SOPR	
		Grade 1	Grade 3	Grade 1	Grade 3
Predominantly English	Mean	21.80	21.91	6.77	9.23
	SD	4.06	3.22	4.70	6.73
	N	190	184	148	127
Equal Use of English and an Indian language	Mean	19.48	21.52	14.78	15.80
	SD	4.23	3.38	6.85	7.23
	N	149	116	150	114
Predominantly an Indian Language	Mean	17.29	19.20	17.58	18.72
	SD	4.92	4.59	6.00	5.63
	N	453	300	434	301
	F	66.3911	31.1406	181.9862	102.6490
	Sig. Level (P)	.0000	.0000	.0000	.0000

TABLE 5.8. Percentage of students in combined English and Indian language SOPR score categories

SOPR Total Scores		Native language					
Indian language	English	Navajo	Siouan	Algonquian	Other Indian	English	Overall
0	5-11	0%	0%	0%	0%	0.4%	0.1%
	12-18	0	0	0	0.8	3.3	0.9
	19-25	0	0	0	0.8	30.3	6.7
5-11	5-11	2.7	0	0	0.4	1.5	1.5
	12-18	3.0	4.1	10.9	9.3	5.9	5.6
	19-25	8.7	25.6	45.7	15.3	35.1	20.0
12-18	5-11	6.5	0.8	1.1	2.4	0.0	3.3
	12-18	15.8	5.0	5.4	10.5	2.6	10.1
	19-25	12.4	12.4	14.1	12.9	11.1	12.3
19-25	5-11	6.1	1.7	0	4.4	1.1	3.8
	12-18	18.4	11.6	1.1	14.1	3.0	12.3
	19-25	26.4	38.8	21.7	29.0	5.9	23.4
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	No. of Cases	526	121	92	248	271	1258

English and Indian language SOPR categories, presented for the individual language groups and overall. For the purposes of analyzing oral proficiency within combined categories of English and Indian-language proficiency, the range of total SOPR scores were divided into three categories: scores of from 5-11 in English and 0-11 for Indian language proficiency (no proficiency or very limited oral proficiency); 12-18 (limited oral proficiency); and 19-25 (moderate to full oral proficiency in the language).

Those students who are rated between 5 and 11 on English and between 0 and 11 on the Indian language might be considered to be "at risk" academically since they have at the most only minimal proficiency in their two languages. Overall, 1.6% of the students fall within these "at risk" categories.

Since a total score of from 12 to 18 on the SOPR indicates a limited proficiency in the language, those students who did not score any higher than 18 on either English or the Indian language might also be considered to be somewhat at risk. Without a level of proficiency in either language that is close to the level expected of a monolingual native speaker of the language, the student may be less able to participate in instruction, whichever language were used in instruction. Overall, including all students whose total oral proficiency ratings in both languages were 18 or lower within the "at risk" category puts a total of about 22% of the students in this category. These included 28% of the Navajo-language students, about 10% of the Siouan-language students, about 17% of the Algonquian-language students, about 23% of the Other Indian-language students, and about 18% of the students whose native language was English.

5A.3 ACADEMIC APTITUDE

The Raven Progressive Matrices Test (see Appendix E for a description of this instrument) was incorporated into the study plan in order to provide a measure of the child's academic ability which, unlike most such measures, would not be operationally dependent on a knowledge of the English language.

Table 5.9 shows the distribution of total adjusted scores on the Raven for grades 1 and 3, and also the distribution of some part scores. It can be seen from these distributions that a very large part of the entire range of possible scores is covered. The "A+B" scores are of particular interest because they permit comparison of grades 1 and 3 on the same set of 24 items thus providing some indication of the gain in the type of reasoning ability tested over the two-year period.[1] (See Table E.2 in Appendix E.)

Table 5.10 shows how the Indian students in the present study compare on their Raven scores with the English-Proficient and LM-LEP students in the LM-LEP Study. It is clear from this table that the Indian children score at about the same level, on the average, as the non-Indian English-proficient students and a little higher than the non-Indian LM-LEP students. When compared with recently developed composite norms[2] based on a broad spectrum of U.S. children in grade 1, the Indian children are at roughly the 60th percentile; for grade 3 the comparable value is the 47th percentile[3]. Thus, in terms of academic aptitude, these children are in the average range or possibly slightly higher.

As shown in Table 5.11 Raven scores definitely are related to mastery of English. In that table, Raven means and standard deviations are shown for students with various levels of total ratings on the English SOPR. The correlation between Raven total and English SOPR is .23, for both grade 1 and grade 3; these correlations are not high, but they are statistically significant. Bearing in mind that the Raven is a nonlanguage test, it seems

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[1] The only way the items for the two grades differ is that in the CPM, taken by the grade 1 cohort, the diagrams are colored, whereas in the SPM, taken by the grade 3 cohort, they are printed in black and white. This difference is a superficial one since the colors have nothing to do with the problem posed by the item or with selection of the correct answer.

[2] Published by Psychological Corporation, 1986.

[3] Since the percentiles are for children classified by age, rather than by grade, the grade 1 percentile is based on children just under 7 years old while the grade 3 value is for 9-year-olds.

TABLE 5.9. Distribution of Raven adjusted scores for parts and total

	No. of Cases		
	Grade 1 CPM	Grade 3 SPM	
Score	**Total**	Scales C+D+E	**Total**
51-60			-
50			1
49			1
48			1
47			-
46			2
45			3
44			7
43			8
42			6
41			5
40			12
39			12
38			17
37			16
36	1	-	24
35	1	-	22
34	2	-	19
33	1	-	28
32	4	-	24
31	10	-	36
30	11	-	28
29	8	-	26
28	19	-	27
27	25	-	17
26	32	1	27
25	37	2	22

	No. of Cases					
	Grade 1, CPM			Grade 3, SPM		
Score	Scales A+B	Scale AB	Total	Scales A+B	Scales C+D+E	Total
24	2		44	7	1	23
23	3		69	19	5	24
22	4		56	24	12	20
21	12		54	47	11	29
20	10		51	48	14	21
19	13		35	54	16	23
18	20		52	57	16	15
17	57		43	76	24	17
16	67		46	86	36	12
15	90		28	67	37	7
14	106		30	48	36	15
13	78		34	27	37	7
12	68	7	24	20	47	6
11	81	37	17	12	25	2
10	61	59	13	10	32	1
9	36	98	10	3	43	2
8	23	107	9	4	41	-
7	19	112	6	3	19	1
6	10	95	3	1	29	-
5	8	66	2	1	22	-
4	8	78	-	-	44	-
3	1	72	-	1	31	-
2	-	30	-	1	20	-
1	-	15	-	-	12	-
0	-	1	-	-	3	-
N	777	777	777	616	616	616
M	13.19	6.57	19.72	16.88	10.91	27.78
σ	3.51	2.59	5.64	3.43	5.64	8.13
Max. Possible Score	24	12	36	24	36	60

TABLE 5.10. Comparison on Raven total adjusted scores between Indian students and students in the LM-LEP Study*

	Grade 1 Raven CPM			Grade 3 Raven SPM		
	Mean	S.D.	N	Mean	S.D.	N
Indian students	19.76	5.59	777	27.78	8.13	616
LM-LEP Study students:						
LM-LEP students	18.25	5.80	4670	25.29	9.16	2994
EP/Comp students**	19.18	5.68	444	27.10	8.92	403

*Findings presented here from the LM-LEP Study are taken from Young *et al.* (1986), Chapter 4, Table 4.14.

**EP/Comp = English-proficient students in "comparison sample."

TABLE 5.11. Means and standard deviations of Raven total adjusted scores for students classified in terms of English SOPR total

	Grade 1 Raven CPM			Grade 3 Raven SPM		
English SOPR Total	Mean	S.D.	N	Mean	S.D.	N
25	21.99	4.94	134	29.82	8.43	130
20-24	20.69	5.72	248	27.81	8.05	258
15-19	19.11	5.17	204	26.62	7.11	122
10-14	17.50	5.25	107	22.50	7.31	40
5-9	17.42	5.13	38	23.29	8.64	7
TOTAL	19.85	5.54	731	27.58	8.09	557

unlikely that mastery of English is among the causal factors accounting for high Raven scores. Rather, we surmise, there is some causality in the opposite direction; students with high Raven scores tend to have a high level of academic aptitude including the kind of verbal ability that is useful in learning English. There appears to be no such causal relation for the Indian-language SOPR, however. Table 5.12 provides some evidence on this point. In this table Raven means and standard deviations are shown for students classified jointly on the English SOPR and Indian-language SOPR. If we compare means across columns for any single row (i.e., for groups

TABLE 5.12. Means and standard deviations of Raven total adjusted scores for students classified in terms of their SOPR scores

SOPR Total Score	English SOPR →	Grade 1			Grade 3		
		5-11	12-18	19-25	5-11	12-18	19-25
Indian-Lang. SOPR ↓		Raven CPM			Raven SPM		
19-25	M	18.3	19.3	20.8	25.5	24.9	28.6
	σ	5.3	5.2	5.4	6.7	7.0	8.0
	N	26	95	114	14	45	153
12-18	M	17.4	18.2	20.6	18.0	16.4	28.8
	σ	5.7	5.7	5.0	6.6	6.7	7.4
	N	27	75	80	8	42	70
5-11	M	16.7	18.1	20.9	23.2	26.4	28.4
	σ	4.2	5.7	5.4	11.9	8.1	8.5
	N	10	50	134	4	18	108
4	M	-	18.6	20.6	-	24.0	28.4
	σ	-	3.5	5.7	-	12.7	8.5
	N	0	9	45	0	2	35

homogeneous with respect to Indian-language SOPR), we find even stronger evidence than that provided by Table 5.9 for the relation between English SOPR and Raven. Comparison of means within a column, however, provides no equivalent finding for Indian-language SOPR; for groups homogeneous with respect to English SOPR, Raven and Indian-language SOPR are essentially unrelated.

There is a seeming paradox here. The Raven, a nonlanguage test, seems to predict proficiency in one language, English, but to have nothing to do with proficiency in other languages. The explanation is probably that all the students, regardless of the extent to which they have been exposed to their tribe's Indian language, either in or outside of school, are under some pressure from the school to acquire proficiency in English (or if they are already proficient in English to continue improving their skills in it). Conversely, there is not likely to be uniform pressure on students to augment their skills in the tribal language. As a matter of fact, many of the students in the study have had little or no exposure to that language. It is quite reasonable to suppose that the Raven, the instrument we are using as a measure of academic aptitude, is a good indicator of the likelihood that a child will learn what he is taught or even, in the absence of formal instruction, that he will learn a language to which he is exposed. But the Raven does not operate in a vacuum; a high score on it does not cause learning to take place when there is no opportunity for that learning to occur.

5B B. STUDENT PERFORMANCE ON ENGLISH AND MATHEMATICS ACHIEVEMENT TESTS

The vocabulary, reading comprehension, and mathematics subtests of the Stanford Achievement Test (SAT) were selected as the principal measures of academic achievement for this study.[1] The overall study design called for testing students in the spring of 1986 and the spring of 1987, and the results of analyzing the two years of test data will be contained in the report on the second phase of this study. Presented below are analyses of the results from tests conducted in the spring of the 1985-1986 school year.

5B.1 DISTRIBUTIONAL DATA WITH STUDENT AS THE UNIT OF ANALYSIS[1]

a. Comparisons with Other LM-LEP Students

Basic distributional data on the SAT subtests are shown in Appendix G (Table G.1) for adjusted scores.[2] Examination of these distributions shows that the scores on all tests, in both grades, are spread out well; they cover a wide range and are not conspicuously bunched at either end. Table 5.13, in the "Indian Students" columns for grade 1 and grade 3, presents means and standards deviations on adjusted SAT scores. These data provide evidence that the levels of the SAT chosen for this study are appropriate.

In addition to data for the Indian students, Table 5.13 summarizes the corresponding means and standard deviations for grade 1 and grade 3 students in the LM-LEP study. Comparison of the students in the two studies reveals that the Indian students score somewhat higher on Vocabulary and Reading Comprehension than the LM-LEP students but slightly lower in math. The Indian students score substantially lower than the English-proficient students on all SAT tests. This is in contrast to the corresponding data on the Raven, which shows that on that test the Indian children are at about the same level as English-proficient children (see Table 5.10). Part of the reason the Indian children score lower on school achievement tests than English-proficient children is undoubtedly that, to the extent that their English proficiency is limited, they are at a disadvantage when instruction is in English. Evidence for this hypothesis is provided in Table 5.14. In that table, means and standard deviations are presented for Raven and SAT scores on students classified in terms of whether English or an Indian language is predominant in their communities. Presumably the less English

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[1] Details about the Stanford Achievement Test are presented in Appendix F.

[2] All data reported on the Stanford Achievement Test in this chapter, except where otherwise explicitly stated, use "adjusted scores" rather than "rights scores." The distinction between these two types of scores and our reasons for preferring the former are discussed in Appendix F.

TABLE 5.13 Comparison of Indian students and students in LM-LEP Study, with respect to SAT adjusted scores

SAT Score		GRADE 1			GRADE 3		
		Indian Students	LM-LEP Study Students*		Indian Students	LM-LEP Study Students*	
			LM-LEP	EP/Comp**		LM-LEP	EP/Comp**
ENGLISH							
Vocabulary	M	19.08	18.6	22.4	16.19	14.0	20.0
	σ	6.11	5.6	6.2	6.44	5.3	6.4
	N	752	2776	389	566	2816	411
Rdg. Comp.	M	23.17	22.6	27.8	29.75	27.6	37.4
	σ	8.43	8.4	9.1	11.54	10.4	11.8
	N	772	2797	404	596	2880	410
Eng. Total	M	42.30	41.5	50.7	45.94	41.8	57.6
	σ	13.14	12.4	13.5	16.38	14.1	16.7
	N	751	2565	383	562	2705	396
MATH							
Concepts of No.	M	19.94	20.5	21.9	18.03	18.4	20.8
	σ	5.99	6.1	5.7	6.32	6.2	6.1
	N	771	3799	402	596	3248	419
Computation	M	13.65	14.5	14.2	22.48	27.2	27.3
	σ	5.09	5.0	5.0	8.60	9.0	9.3
	N	766	3883	393	596	3333	417
Applications	M	12.88	13.5	14.9	17.39	18.2	21.5
	σ	4.33	4.4	4.1	7.44	7.7	8.5
	N	763	3327	390	590	2889	412
Math Total	M	46.55	48.8	51.2	57.84	64.6	70.3
	σ	13.67	13.4	12.9	19.58	19.9	20.5
	N	761	3491	384	585	2760	396
ENGLISH + MATH TOTAL	M	89.10	91.0	102.2	103.72	107.3	128.3
	σ	24.92	23.2	24.7	33.38	30.8	34.7
	N	742	2447	368	549	2565	385

*Findings presented here from the LM-LEP Study are taken from Young et al. (1986), Chapter 8, Tables 8.1a and 8.1b.

**EP/Comp = English-proficient student in "comparison" sample.

TABLE 5.14 Test score means and standard deviations for grade 1 students in 3 categories of community language use

Test	Predominantly English			Equal use			Predominantly Indian language			Analysis of variance	
	M	σ	N	M	σ	N	M	σ	N	F	Signif. level
Raven (CPM)	20.31	5.20	189	19.25	5.96	147	19.69	5.61	441	1.55	.2133
Stanford Achievement Test											
English											
Vocabulary	23.93	6.16	174	19.93	5.60	147	16.75	4.85	427	114.50	.0000
Reading Comprehensive	27.56	8.97	178	24.17	8.30	150	20.95	7.36	439	45.37	.0000
Total	51.53	13.70	173	44.05	12.55	147	37.82	10.65	427	85.21	.0000
Math											
Concepts of No.	23.64	5.94	178	20.55	5.80	150	18.22	5.31	438	61.24	.0000
Computation	15.70	4.56	176	14.01	5.21	149	12.67	5.00	437	24.14	.0000
Applications	15.55	4.15	176	13.10	4.10	147	11.71	3.97	436	56.83	.0000
Total	54.97	12.90	176	47.86	13.22	147	42.62	12.42	434	60.26	.0000
English + Math											
Total	106.68	25.08	173	92.13	24.06	143	80.66	20.63	422	84.36	.0000

the child hears in the community, the more likely the child is to have only limited proficiency in English. An inspection of the table makes it clear that of the three groups — (A) English-predominant, (B) about equal use of English and (C) Indian-language-predominant — the English-predominant group scores highest and the Indian-predominant lowest, on all SAT tests, even though the groups are about equivalent on the Raven.

This is confirmed by the analyses of variance data presented in the last two columns; the F ratio for every SAT variable is statistically significant at a level which makes the probability of getting similar results by chance virtually infinitesimal (or, to put it more precisely, the chances are less than one in 10,000 that such results would be obtained if the scores in the three categories were equal).

But even though there is strong evidence that lack of proficiency in English is at least partly responsible for below-average performance of Indian students, this is apparently not the sole explanation for the lower score. If this were the case, the Computation means of the Indians would be much closer to the corresponding means for the English-proficient groups in the LM-LEP study than they are instead of falling below the LM-LEP group's means (see Table 5.13). Note, however, that on the two English tests, Vocabulary and Reading Comprehension, the Indian students score somewhat higher, on the average, than the LM-LEP group.

The fact that the SAT math scores of Indian students were not only below those of English-proficient students in the LM-LEP Study but were also significantly lower than those of the LM-LEP students in that study is somewhat surprising since, as Table 5.13 also shows, Indian students scored better than LM-LEP students on the English subtests of the SAT. The explanation of the Indian students' poor performance on the math subtests is most likely the same as that offered by Davison and Schindler (1986) for why Indian students in general have difficulty learning math. Specifically they conclude that (pp. 184-5):

"Three influences affect the American Indian student's capacity to learn English language mathematics. The first is the role of language, the second is the culture, and the third is the student's learning style.

"The authors found that Crow Indian bilingual students are not maintaining mastery of the Crow language as far as knowledge of Crow language mathematical terminology is concerned. This raises questions about the impact of bilingual education in mathematics instruction, at least in terms of mathematical vocabulary. Incomplete learning of mathematics vocabulary in the children's first language may be creating children who have incomplete mastery of either their first language's mathematics constructs or the constructs of English. The influence of the students' culture, and the perceived relevance of the mathematics curriculum, is seen as an additional problem. Except for working with money, students do not perceive the mathematics they learn in school to be of any use to them, nor is the school curriculum seen as culturally relevant. Most significantly, the students did not share either a large number or a wide range of goals. The school curriculum, as far as these students were concerned, related to just one goal -- earning money. Even though these students were young, school had very little meaning for them.

"The methods by which mathematics is typically presented do not consider the Indian student's learning style. Textbooks are typically written for white middle class America and present mathematics as an essentially abstract subject. While many textbook series now make reference to the use of tactile and visual aids, few teachers present mathematics in other than an abstract manner. The Indian student depends upon a more sensory approach to be able to learn mathematics effectively."

b. Comparisons with National Norms

A comparison of the Indian students with national norms requires use of rights scores rather than adjusted scores because rights scores are the kinds of scores on which national percentiles are provided by the test publisher. Table 5.15 shows the means and standard deviations of the rights scores for the Indian children.

Table 5.16 shows national percentiles corresponding to the mean rights score and to points one standard deviation above and one standard deviation below the mean.[1] This table indicates that the Indian students scored

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[1] In a normal distribution, one standard deviation above the mean is the 84th percentile and one standard deviation below is the 16th percentile.

TABLE 5.15 Means and standard deviations on SAT rights scores

SAT Rights Score		Grade 1 (Primary 1 battery)	Grade 3 (Primary 3 battery)
ENGLISH			
Vocabulary	M	19.02	16.06
	σ	6.18	6.50
	N	752	566
Rdg. Comprehension	M	21.96	28.94
	σ	9.44	11.80
	N	772	596
MATH			
Concepts of No.	M	19.74	18.00
	σ	6.12	6.34
	N	771	596
Computation	M	--	22.16
	σ	--	8.93
	N	--	590
Applications	M	--	17.28
	σ	--	7.46
	N	--	590
Comput. + Applic.	M	26.21	--
	σ	8.72	--
	N	762	--
Math Total	M	46.03	57.39
	σ	14.01	19.82
	N	761	585

TABLE 5.16 SAT percentiles corresponding to mean rights score (R) and to one standard deviation above and below mean

SAT RIGHTS Score (form F)		Grade 1		Grade 3	
		$\bar{R}$	%ile	$\bar{R}$	%ile
ENGLISH					
Vocabulary	$M + \sigma$	25.2	54	22.6	49
	M	19.0	25	16.1	21
	$M - \sigma$	12.8	6	9.6	4
Rdg. Comprehension	$M + \sigma$	31.4	51	40.7	51
	M	22.0	27	28.9	25
	$M - \sigma$	12.5	6	17.1	8
MATH					
Concepts of No.	$M + \sigma$	25.9	50	24.3	60
	M	19.7	21	18.0	31
	$M - \sigma$	13.6	5	11.7	11
Computation	$M + \sigma$	--	--	31.1	52
	M	--	--	22.2	24
	$M - \sigma$	--	--	13.2	7
Applications	$M + \sigma$	--	--	24.7	52
	M	--	--	17.3	27
	$M - \sigma$	--	--	9.8	8
Comput. + Applic.	$M + \sigma$	34.9	54	--	--
	M	26.2	24	--	--
	$M - \sigma$	17.5	8	--	--
Math Total	$M + \sigma$	60.0	53	77.2	53
	M	46.0	23	57.4	26
	$M - \sigma$	32.0	7	37.6	8

systematically below the national norms. Specifically, their mean Vocabulary scores were at the 25th and 21st percentiles (grade 1 and grade 3 respectively), and the corresponding figures for Reading Comprehension were the 27th and 25th percentiles. For the first part of the Math test, Concepts of Number, the grade 1 and grade 3 means were at the 21st and 31st percentiles respectively. For Computation and Applications combined, separate norms are not available for the battery given in grade 1; for the combination, the mean is at the 24th percentile. Separate Computation and Applications norms are available for the batteries used in grade 3; these two means are at the 24th and 27th percentiles respectively.

These results are somewhat at variance with the results obtained in a 1981-83 national study of Indian public school students also carried out by Development Associates.[1] In that study, it was found that the academic performance of Indian students in reading and mathematics was only slightly lower than that of all students in public school settings (i.e., approximately 2.8 T score points, or about one-fourth of a standard deviation below the population mean of 50) and that the shape of the distribution of test scores was approximately the same. It is likely that the difference in results of that study and the current study is due largely to geography and poverty. The earlier study, which included a large proportion of non-reservation Indians including many from urban and suburban areas, found that students in districts on or near reservations scored slightly lower than other Indian students as did students receiving free or subsidized school lunches and those using relatively less English at home. The sample for the present study consists entirely of students on or near reservations, in very rural areas. Over 85% of these children were born on the reservation, and over 80% of them (86% in grade 1 and 81% in grade 3) received free school lunch. Many of these students, thus, have little contact with people other than Indians, and in many cases they are isolated in groups where an Indian language is spoken. Also, because they have less contact with non-Indians, the viewpoint described in the Davison-Schindler quotation above as that of the typical Indian student is likely to have a firmer hold than in groups of Indians more fully integrated into the non-Indian world.

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[1] Young, Malcolm B. et al., (1983), The evaluation of the Part A Entitlement Program funded under Title IV of the Indian Education Act, Final Report, Washington, DC: Office of Program, Budget, and Evaluation, U.S. Department of Education.

5B.2 DATA WITH PROJECT AS THE UNIT OF ANALYSIS

In Table 5.17a we present grade 1 means for each of the visited projects on all the SAT variables and also on SOPR totals (both English and Indian language) and Raven total[1]. Overall means and standard deviations (all projects combined) are also shown for these variables. National percentile values corresponding to mean Rights scores for each project are also shown in this table for all the SAT variables for which they are available. Table 5.17b presents corresponding data for grade 3.

Table 5.18a summarizes the national percentiles corresponding to the project mean SAT scores, and Table 18b presents the same data in cumulative percent form. As shown in Table 5.18b, across all grade 1 subtests from 30 to 50 percent of the project means were below the 25th percentile, and 78 to 100 percent were below the 50th. The picture is worse for grade 3; 26 to 61 percent of the means were below the 25th percentile, and for most of the tests all of the project means were below the 50th.

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[1] Corresponding standard deviations and numbers of cases are shown in Appendix G (Tables G.2a and G.2b for the standard deviations and Tables G.3a and G.3b for the numbers of cases).

TABLE 5.17a. Project means, percentiles, and percentages on selected variables: Grade 1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		% of students whose native language is			Mean hours per week								Percentages					
							English (incl. rdg.)								Use of Simplified Eng. in teaching			
Project #	Community-use of Ind. lang.	Ind. lang. ***	Eng. ***		Rdg (Reg. Eng.)	Spec. Eng. except Oral	Reg.	Spec.	Total	Ind. lang.	Math	Math taught in Eng.	Ind. lang. used in MSS*	Spec Instr in Eng. ***	MSS*	Eng.	Instr. in Ind. lang. arts ***	Major cluster (mean) **
1	3.00	100	0		00	2.05	2.50	5.00	7.50	5.00	2.50	.75	67	100	100	24	100	2.00
2	4.70	100	0		2.02	1.22	3.49	6.60	10.09	3.16	2.56	2.48	40	100	0	29	63	2.98
3	.71	83	17		6.21	3.36	10.96	11.27	22.22	6.56	5.55	4.34	25	100	23	49	100	2.96
4	-.63	82	18		11.14	.00	16.85	.00	16.85	2.82	5.82	5.81	16	0	0	94	91	3.18
5	5.10	100	0		2.99	.18	6.83	2.87	9.70	1.16	3.09	2.74	20	84	54	49	60	2.79
6	1.00	94	6		5.90	.00	11.79	1.29	13.08	.00	2.99	1.77	37	71	71	69	00	3.10
7	4.91	100	0		-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	3.33	75	25		9.26	2.42	14.11	6.95	21.05	2.11	4.63	3.94	19	100	58	58	42	3.12
9	-1.75	21	79		5.44	.21	12.26	.27	12.53	1.92	5.26	5.23	14	18	5	12	100	3.76
10	2.50	97	3		9.12	.00	11.96	.30	12.26	1.33	4.51	4.03	16	27	0	0	60	3.77
11a	-7.14	100	0		-	-	-	-	-	-	-	-	-	-	-	-	-	-
11b	-2.15	100	0		8.00	.50	11.00	1.00	12.00	1.00	5.50	5.25	10	100	11	9	100	3.00
12	3.00	100	0		2.50	1.43	3.93	3.40	7.33	.00	2.73	1.84	36	71	71	67	0	2.86
13	-7.60	2	98		4.50	.44	9.64	1.41	11.05	.00	4.09	4.09	0	100	22	42	0	4.00
14	-7.20	0	100		6.00	.00	11.00	.00	11.00	.00	4.00	4.00	0	0	0	0	0	5.00
15	-3.88	10	90		1.00	.00	2.50	.00	2.50	.00	5.00	5.00	0	0	0	0	0	5.00
16	-1.00	100	0		8.50	.00	12.70	.00	12.70	2.00	4.50	4.12	13	0	0	8	100	3.00
17	-4.26	0	100		9.13	1.00	12.42	2.00	14.42	.00	4.50	4.50	0	100	0	3	0	4.00
18	-4.79	4	96		10.95	5.43	12.47	10.87	23.34	.00	4.69	4.69	0	87	74	9	0	4.13
19	-6.67	0	100		8.17	.15	11.67	.15	11.82	.00	5.62	5.62	0	6	0	0	0	4.94
20	-3.05	89	11		6.44	.82	9.77	1.74	11.50	1.01	5.09	5.09	0	71	1	2	65	4.29
21	-8.16	50	50		8.24	.23	13.00	.47	13.50	.27	5.43	5.43	0	47	0	3	53	4.53
22	5.03	100	0		8.35	4.35	11.67	8.69	20.37	.00	5.17	5.17	0	100	62	63	0	4.00
23	4.93	100	0		5.16	3.57	8.62	7.44	16.06	9.80	3.46	2.64	33	100	0	30	100	3.00
All	1.16	76	24		5.79	1.23	9.60	3.65	13.26	1.51	4.09	3.71	18	71	33	34	51	3.47
σ	4.39	43	43		3.96	1.95	5.36	3.97	6.31	2.17	1.51	1.96	24	48	43	39	50	96
N	874	663	211		684	685	684	685	684	685	685	788	685	788	767	717	788	665

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TABLE 5.17a. (Continued)

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	
Mean									Percentile corresponding to mean Rights score							Home-and-family variables (means)				
SAT Primary 1 (Form F)														Mean SOPR Total					Range of N ****	
English			Math				Total (Eng + Math)	Raven (SPM) Total			Math									
Vocab.	Rdg.	Total	Concepts of no.	Comput.	Applic.	Total			Vocab.	Rdg.	Concepts of No.	Comput. + Applic.	Total	Eng.	Ind.	Parents' Ed. (B)	Parents' use of Eng. in home (A)	Socio-econ. Status	From-To	Project #
15.44	15.72	31.17	19.17	15.39	10.89	45.44	76.61	18.19	12	10	19	24	22	13.82	25.00	-	-	-	18-23	1
17.10	18.05	35.14	19.11	14.49	12.60	46.21	81.35	19.64	18	14	18	25	23	18.53	15.59	(10.09)	(1.88)	(19.40)	5-69	2
19.13	22.48	41.61	16.09	11.87	10.61	38.57	80.17	16.63	26	28	10	15	13	19.33	12.46	12.35	2.58	18.61	23-24	3
21.64	25.73	47.36	21.40	13.00	13.60	48.00	96.90	19.91	37	34	27	24	26	21.45	13.45	-	-	-	10-11	4
15.86	22.67	38.53	16.73	12.35	10.91	39.99	78.47	19.71	13	26	12	15	14	16.13	18.27	(9.63)	(1.58)	(17.38)	52-175	5
15.86	21.10	36.62	18.29	12.45	10.61	41.73	77.89	19.77	13	24	16	16	16	16.04	19.16	(10.55)	(1.53)	(18.55)	11-54	6
13.85	15.41	29.27	14.39	10.83	9.05	34.27	63.54	18.06	8	9	7	10	8	15.68	17.00	(6.67)	(1.44)	(14.38)	4-48	7
16.12	18.75	34.86	20.26	13.42	13.63	47.32	82.19	20.16	14	18	23	26	25	18.88	15.00	(9.54)	(1.98)	(17.04)	28-92	8
23.06	27.09	50.34	24.06	18.41	16.38	58.85	110.06	22.56	44	40	39	53	49	23.00	(8.85)	10.51	2.50	18.27	30-34	9
22.19	28.61	50.81	22.17	10.74	14.58	47.83	99.27	23.13	37	43	31	21	26	20.29	15.13	-	-	-	30-31	10
44.00	20.76	46.76	22.09	15.44	15.00	54.22	102.00	17.75	38	39	34	40	38	17.14	12.78	11.84	4.00	(18.38)	4-9	11a
24.57	20.29	44.86	20.86	9.57	13.57	44.00	88.86	22.83	50	20	24	15	19	20.83	23.14	12.05	3.60	-	5-7	11b
21.00	20.43	42.00	22.62	12.52	13.20	48.20	92.63	19.84	33	18	33	20	25	20.90	22.78	-	-	-	9-30	12
23.15	26.12	49.02	22.35	15.80	14.82	52.97	102.00	19.52	45	35	32	37	35	21.14	4.00	11.13	3.93	(20.64)	21-45	13
26.25	31.73	58.09	26.83	15.92	18.58	61.33	120.82	22.42	59	51	55	51	56	21.62	4.00	12.17	4.00	18.50	8-13	14
28.63	35.33	64.63	28.78	19.38	19.75	68.63	133.25	22.60	71	63	68	75	76	24.67	-	11.34	2.88	19.30	5-10	15
22.88	28.88	51.75	24.33	14.88	15.58	54.79	106.54	15.16	43	45	42	37	40	20.40	14.72	10.40	2.20	(17.88)	8-25	16
23.00	27.19	50.43	23.00	15.31	13.94	52.25	103.93	18.63	44	36	34	32	34	16.38	5.13	9.64	2.30	(17.43)	7-16	17
21.52	29.78	51.30	21.48	14.78	13.96	50.22	101.52	19.58	36	46	28	31	31	18.95	8.61	11.31	2.77	(16.77)	11-23	18
27.00	32.84	59.84	26.63	18.00	17.50	62.13	121.97	20.44	63	55	54	56	58	24.97	-	11.84	3.84	18.50	26-35	19
21.29	17.69	39.14	20.97	13.07	13.79	48.18	87.32	21.42	35	2	24	24	26	24.12	9.42	11.04	2.41	18.00	19-38	20
27.38	30.25	57.63	25.63	15.00	16.13	56.75	114.38	20.60	65	48	49	38	44	22.31	7.25	12.08	3.87	20.90	8-16	21
18.34	25.24	43.58	18.66	13.32	11.47	43.45	87.03	19.54	22	32	17	20	19	17.28	17.87	8.92	.40	14.66	22-40	22
-	15.29	-	16.00	7.63	8.75	32.38	-	13.38	-	10	9	5	7	17.50	18.63	8.86	1.43	-	7-8	23
19.05	23.12	42.22	19.94	13.64	12.87	46.51	88.98	19.76	25	27	21	24	23	18.78	14.82	10.42	2.34	17.96	294-792	All
6.09	8.39	13.07	3.98	3.09	4.33	13.65	24.83	3.59						4.96	7.27	3.44	1.34	4.60		
748	767	747	766	762	759	757	738	777	748	767	766	758	757	792	732	421	422	294		

NOTE: Means and percentages based on fewer than 4 cases are not included in this table. Values based on fewer than half the maximum number of cases for the row are in parentheses.

*MSS = Math, science, social studies, ethnic heritage

**Major cluster code: 1=A, 2=B, 3=C, 4=D, 5=E or F.

***Dichotomous variable.

****Based on the values of N corresponding to columns 5-32 and the sum of the values for columns 2-4.

TABLE 5.17b. Project means, percentiles, and percentages on selected variables: Grade 3

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
													Percentages					
		% of students whose native language is			Mean hours per week													
							English (incl. rdg.)								Use of Simplified Eng.in teaching			
Project #	Community-use of Ind. lang.	Ind. lang. ***	Eng. ***		Rdg (Reg. Eng.)	Spec. Eng. except Oral	Reg.	Spec.	Total	Ind. lang.	Math	Math taught in Eng	Ind. lang. used in MSS*	Spec. Instr in Eng. ***	MSS*	Eng.	Instr. in Ind. lang. arts ***	Major cluster (mean) **
2	4.70	100	0		4.20	.00	8.40	.87	9.27	.00	5.75	5.02	15	51	70	9	0	2.98
3	.71	96	4		10.58	2.50	17.46	5.23	22.69	5.00	7.96	6.71	24	100	32	22	100	3.00
4	-.63	78	22		4.61	.00	8.33	.00	8.33	3.20	2.94	2.94	43	0	13	0	100	2.11
5	5.10	100	0		5.09	.39	9.60	1.48	11.08	1.70	4.59	4.39	12	66	44	14	100	3.00
6	1.00	92	8		4.34	.00	8.71	2.44	11.15	.34	4.11	3.03	39	74	76	73	68	2.90
7	4.91	100	0		4.55	3.98	13.95	10.48	24.43	6.00	6.40	4.13	39	100	68	27	100	2.58
8	3.33	71	29		4.36	2.89	7.26	7.54	14.81	2.03	4.66	3.03	36	100	37	34	63	2.58
9	-1.75	13	87		5.01	.19	9.07	.26	9.32	.03	4.48	4.40	3	15	5	24	7	4.74
10	2.50	96	4		4.94	.00	6.98	.14	7.12	.00	3.86	3.45	14	14	0	0	0	3.95
11a	-7.14	95	5		1.00	7.00	8.00	8.00	16.00	2.00	7.00	7.00	0	100	0	0	100	4.00
11b	-2.15	100	0		2.00	5.50	2.50	6.00	8.50	1.00	5.50	5.25	10	100	11	13	100	3.00
12	3.00	100	0		4.61	.00	6.69	.56	7.25	.00	4.69	4.60	2	22	7	4	0	4.59
13	-7.60	3	97		5.22	2.86	8.39	6.21	14.60	.00	3.91	3.91	0	100	0	0	0	4.00
14	-7.80	0	100		6.00	.00	7.20	.00	7.20	.00	3.30	3.30	0	0	0	0	0	5.00
15	-3.88	8	92		6.20	.00	8.50	.00	8.50	.00	5.40	5.40	0	0	0	0	0	5.00
16	-1.00	92	8		7.40	.00	9.84	.00	9.84	1.60	5.58	5.27	5	0	0	9	100	5.00
17	-4.26	23	77		5.00	.00	7.50	.00	7.50	.00	5.00	5.00	0	0	0	0	0	5.00
18	-4.79	70	30		8.41	3.18	12.01	5.03	17.04	.00	5.96	5.96	0	60	1	17	0	4.40
19	-6.67	0	100		1.42	.59	5.47	.59	6.06	.38	5.05	5.05	0	24	3	0	38	4.76
20	-3.05	100	0		6.56	.25	10.45	.40	10.85	9.19	5.27	5.27	0	15	2	2	58	4.85
21	-8.16	48	52		5.53	.22	10.50	.43	10.97	.20	4.88	4.88	0	43	0	9	39	4.37
22	5.03	100	0		4.68	5.08	8.16	9.68	17.84	2.70	3.60	2.92	20	100	67	31	48	3.13
23	4.93	100	0		2.72	4.33	5.43	10.17	15.60	8.20	4.55	2.99	35	100	9	96	100	3.00
All	.34	73	27		4.97	1.48	8.93	3.27	12.21	1.66	4.96	4.43	14	58	28	17	47	3.66
σ	4.70	44	44		2.70	2.26	3.96	3.99	5.86	3.11	1.62	1.91	18	50	37	29	50	1.05
N	672	487	185		585	587	585	587	585	587	587	635	587	635	628	596	636	587

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TABLE 5.17b. (Continued)

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	
Mean adjusted score									Percentile corresponding to mean Rights score						Mean SOPR Total		Home-and-family variables(means)			Range of N ****	Project #
SAT Primary 3 (Form F)								Raven (SPM) Total			Mathematics										
English			Math				Total (Eng + Math)														
Vocab.	Rdg.	Total	Concepts of no.	Comput.	Applic.	Total			Vocab.	Rdg.	Concepts of no.	Comput.	Applic.	Total	Eng.	Ind.	Parents' Ed. (B)	Parents' use of Eng. in home (A)	Socio-econ. Status	From-To	
12.72	26.28	39.00	18.00	25.15	16.36	39.37	98.35	28.47	10	20	31	32	23	28	17.10	18.49	(9.43)	(2.00)	(21.79)	7-55	2
16.88	34.88	51.76	18.56	26.20	20.08	64.84	116.60	24.20	25	38	33	34	35	36	20.38	16.12	12.01	2.31	19.65	23-26	3
19.67	29.67	49.33	15.36	21.67	15.00	52.22	101.56	28.44	36	26	22	23	20	20	21.00	15.36	10.63	2.50		6-9	4
13.11	27.57	40.68	16.97	22.16	16.24	55.01	95.49	29.11	11	22	27	24	22	23	20.67	19.21	(7.42)	(1.44)	(16.21)	33-10	5
10.70	22.24	32.83	13.20	14.10	12.08	36.80	68.42	23.55	6	12	16	6	12	6	20.41	18.77	(11.60)	(1.20)	(18.80)	5-36	6
9.16	18.74	27.89	12.74	15.95	12.05	40.74	68.63	22.14	3	10	14	11	12	10	16.74	23.05	7.32	1.73	(15.83)	6-19	7
15.41	23.82	38.44	18.37	22.95	14.38	55.77	95.11	26.59	19	16	32	26	18	24	18.92	16.87	10.57	2.12	(19.20)	26-83	8
22.41	33.86	56.28	23.93	30.41	21.03	75.38	131.66	26.57	47	34	59	49	39	51	21.93	11.57	10.55	2.50	18.44	18-30	9
(17.00)	36.13	(50.36)	20.43	21.91	20.91	(64.27)	111.00	32.14	24	39	43	23	38	35	21.39	19.26	-	-	-	11-26	10
16.59	30.71	47.29	18.18	19.76	16.12	54.06	101.35	31.76	23	25	32	18	22	22	21.18	10.47	11.25	4.00	17.15	10-19	11a
15.50	35.33	50.83	21.00	22.33	22.00	65.33	116.17	35.20	20	36	45	24	42	36	24.67	24.50	12.65	4.00	19.38	4-6	11b
18.07	33.13	51.50	16.81	15.52	17.48	49.96	101.42	29.81	29	28	26	10	26	17	(22.67)	(14.63)	-	-	-	8-28	12
19.76	32.38	52.14	17.68	24.73	17.70	60.11	112.24	28.94	36	30	29	31	28	28	20.78	4.00	10.26	4.00	(20.83)	12-37	13
23.14	38.36	61.50	21.31	28.15	23.54	73.00	134.15	26.87	52	44	46	41	47	46	23.67	4.00	11.58	4.00	17.55	9-15	14
22.58	38.92	61.50	21.42	29.33	19.75	70.50	132.00	30.92	49	46	46	46	34	43	23.67	-	12.62	3.40	21.94	8-13	15
17.54	33.08	50.62	20.23	20.62	18.31	59.15	109.77	28.00	27	31	42	20	30	27	24.46	14.23	9.75	2.33	(18.30)	5-13	16
12.33	21.25	33.58	12.42	15.92	12.25	40.58	74.17	18.10	10	11	13	10	13	9	22.00	6.82	9.56	3.38	(16.58)	6-13	17
17.75	32.35	50.10	16.50	20.85	17.45	54.80	104.90	28.50	28	26	25	18	27	21	20.05	6.64	10.61	3.27	17.25	10-20	18
22.44	36.35	58.79	22.18	28.13	23.03	72.88	130.44	27.94	48	39	49	41	46	46	24.73	-	12.29	3.87	19.00	30-35	19
20.25	37.25	57.50	21.04	24.00	21.29	66.33	123.83	28.54	38	37	45	26	38	36	21.62	18.32	10.65	2.26	17.86	14-26	20
(16.78)	(35.22)	(52.00)	(19.78)	(20.78)	(22.11)	(62.67)	(114.67)	29.52	(9)	(35)	(40)	(19)	(42)	(32)	21.39	9.23	11.58	3.82	(21.25)	9-23	21
11.48	25.68	37.16	14.58	18.39	15.48	48.45	85.61	26.52	8	19	20	16	21	16	17.55	19.13	9.67	.71	15.53	19-33	22
11.40	18.00	29.40	13.40	18.20	9.20	40.80	70.20	25.20	8	9	16	15	6	10	19.33	19.67	12.60	1.60	18.50	4-6	23
16.13	29.68	45.79	17.99	22.44	17.34	57.71	103.43	27.78	21	25	31	24	27	26	20.48	15.88	10.40	2.56	18.39	266	All
6.35	11.49	16.23	6.29	8.58	7.39	19.47	33.08	8.13							4.19	7.34	3.50	1.31	4.69		
564	594	560	594	594	588	583	547	616	564	594	594	594	588	583	600	542	393	395	255		

NOTE: Means and percentages based on fewer than 4 cases are not included in this table. Values based on fewer than half the maximum number of cases for the row are in parentheses.

*MSS = Math, science, social studies, ethnic heritage.

**Major cluster code: 1=A, 2=B, 3=C, 4=D, 5=E or F.

***Dichotomous variable.

****Based on the values of N corresponding columns 5-32 and the sum of the values for columns 2-4.

TABLE 5.18a. Frequency distribution of student national percentiles corresponding to project means

Percentile	NUMBER OF PROJECTS										
	GRADE 1 SAT Primary 1 Form F					GRADE 3 SAT Primary 3 Form F					
	English		Math			English		Math			
	Vocab.	Rdg.	Concepts of No.	Comput. + Applic.	Total	Vocab.	Rdg.	Concepts of No.	Comput.	Applic.	Total
90 - 100	0	0	0	0	0	0	0	0	0	0	0
75 - 89	0	0	0	1	1	0	0	0	0	0	0
50 - 74	5	3	3	3	2	1	0	1	0	0	1
25 - 49	11	12	10	8	12	10	15	16	9	13	11
11 - 24	6	5	8	10	7	5	6	6	11	9	7
0 - 10	1	4	3	2	2	7	2	0	3	1	4
TOTAL	23	24	24	24	24	23	23	23	23	23	23

TABLE 5.18b. Cumulative frequency and cumulative percentage distributions corresponding to Table 5.18a. percentiles

Percentile		NUMBER AND PERCENTAGE OF PROJECTS										
		GRADE 1 SAT Primary 1 Form F					GRADE 3 SAT Primary 3 Form F					
		English		Math			English		Math			
		Vocab.	Rdg.	Concepts of No.	Comput. + Applic.	Total	Vocab.	Rdg.	Concepts of No.	Comput.	Applic.	Total
0 - 100	N	23	24	24	24	24	23	23	23	23	23	23
	%	100	100	100	100	100	100	100	100	100	100	100
0 - 49	N	18	21	21	20	21	22	23	22	23	23	22
	%	78	87	87	83	87	96	100	96	100	100	100
0 - 24	N	7	9	11	12	9	12	8	6	14	10	11
	%	30	37	46	50	37	52	35	26	61	43	48
0 - 10	N	1	4	3	2	2	7	2	0	3	1	4
	%	4	17	12	8	8	30	9	0	13	4	17

In addition to the variables mentioned above, both Tables 5.17a and 5.17b contain various other variables that may (or may not) be related to some of the SAT scores; among these variables are number of hours of instruction per week in various subjects, extent of use of the Indian language in instruction, whether special instruction in English is provided, whether simplified English predominates when English is taught, major service clusters, and three home-and-family variables (parents' education, parents' use of English, and socioeconomic status). For the convenience of the reader both tables also show the index representing the community's use of the Indian language and the percentage breakdown of the student body according to whether their native language is reported to be English or an Indian language. In connection with this breakdown it should be noted that though in some communities a large percentage of the students are indicated to have English as their native language, this does not necessarily mean that the language they speak is standard English. In many communities the prevalent language is a substandard or nonstandard variety of English in which there are systematic phonological, semantic, and syntactic differences from standard English.

Inspection of Table 5.17a reveals, for example, that Project 15, the project with the least grade 1 instruction in reading (only 1 hour per week) or in any aspect of English (only 2.5 hours, including reading), was the one with the highest SAT means on reading comprehension and on vocabulary. The same project had the highest means on all three parts of the math test. This was less surprising, however, since they had slightly more than the average number of hours of instruction in math, instead of strikingly less, as they did in English. Good academic aptitude probably accounts at least in part for the comparatively good scores, but it cannot be the sole explanation, since the Raven mean for this project, though well above the average for projects in this study, was not the highest. Familiarity with English was probably the other critical factor; for fully 90 percent of the Project 15 students the native language was reported to be English.

This contrasts sharply with Project 10. Though that project had the highest Raven mean for grade 1 and the second highest for grade 3, the SAT means were substantially lower than for Project 15. The explanation probably lies in the fact that in Project 10 the native language of 97 percent of the students was an Indian language (in contrast with 10 percent for Project 15). By grade 3 the differences between SAT means for Project 15 and Project 10 are considerably smaller; in fact they have virtually disappeared for Concepts of Number and for Math Applications. Furthermore, the grade 3 percentiles for these two projects are substantially lower than the grade 1 percentiles even though the grade 3 Raven means are still among the highest. It should be borne in mind that Project 15's test scores were high not only in comparison with other projects but also in comparison with national norms based on a general population of first-graders; in such a comparison the average Project 15 student in grade 1 was at the 71st percentile on Vocabulary, the 63rd on Reading Comprehension, and the 76th on Math Total.

Shifting now to Project 23, the project with the lowest grade 1 mean score on the reading comprehension test, we see that these students averaged 5.2 hours per week of instruction in reading English, which is a little below the mean (5.8 hours). However, they received 9.8 hours a week of Indian language arts in contrast with a mean across projects of only 1.5 hours. This, in combination with the fact that all of the students in this project are reported to have an Indian language as their native language, suggests that maintenance and development of their Indian-language skills is regarded as an important goal in Project 23. This goal is apparently not pursued at the expense of English instruction, however; these students are receiving over 16 hours a week of instruction in English language arts -- substantially above the mean of 13.3 hours for students in this study. In math, as in reading comprehension, the grade 1 project averages are at or near the bottom; this applies on all three math subtests. By grade 3, however, (as seen in Table 5.17b) their computation scores have improved substantially, the average computational skill level rising to only half a standard deviation below the mean of all projects. Computation is the one SAT test in which a deficit in English should not be a handicap. The fact that, relative to the total group of projects, the Project 23 children's scores are not increasing much on SAT tests other than computation suggests that these students are being held back somewhat by their lack of a good command of English. This is clearly not because inadequate time is being devoted to English instruction; 16.1 hours per week in grade 1 and 15.6 hours in grade 3 are surely generous time allotments. The fact that the parents of Project 23 students speak English relatively little at home may be an important factor.

In the paragraphs above we have examined a comparatively high-scoring project (Project 15), a moderately low-scoring project (Project 10), and a very low-scoring project and have pointed out certain salient features. A word of caution is in order at this point; it is important to avoid overinterpreting those data since the numbers of cases on which they are based are quite small in some instances. (See column 38 of Table 5.17a and column 39 of Table 5.17b for an overview of numbers of cases and Tables G.3a and G.3b, in Appendix G, for more details.) Partly because of the small numbers and partly because these data represent only the first year of a two-year longitudinal study, we have not come to any firm conclusions as to reasons for the various differences we have noted. Rather we view these data as a source of hypotheses which should be investigated further using this data set and after the second year of data collection is complete.

5C C. CORRELATES OF STUDENT PERFORMANCE

5C.1 RELATION TO ACADEMIC APTITUDE AND ENGLISH ORAL ABILITY

Table 5.19 shows the correlations of students' scores on the Raven Progressive Matrices Test with their scores on measures of academic achievement; i.e., the English and mathematics subtests of the Stanford Achievement Test. Since the Raven in its capacity as a test of academic aptitude would normally be expected to have fairly high correlations with measures of academic achievement, a word of explanation is in order as to why the Table 5.19 correlations are not higher. The explanation almost

TABLE 5.19. Correlation of Raven Progressive Matrices total adjusted scores with Stanford Achievement Test adjusted scores

SAT Score	Correlation Coefficient Raven CPM and SAT Primary 1 Grade 1	Correlation Coefficient Raven SPM and SAT Primary 3 Grade 3
English		
Vocabulary	.278	.306
Rdg. Comp.	.273	.405
Eng. Total	.304	.406
Math		
Concepts of No.	.388	.459
Computation	.322	.339
Applications	.398	.459
Comput. + Applic.	.398	.439
Math Total	.416	.471
English + Math		
Total	.390	.479
No. of Cases	675	511

certainly lies in the limited-English-proficient status of some of the students and the fully English-proficient status of others. The degree to which a student is English-proficient can reasonably be expected to affect his or her achievement test scores, but it should not affect Raven scores. The Raven, thus, predicts what the student's level of achievement would be if he(she) were fully English-proficient—or to state it another way, the Raven predicts what level of achievement can be expected from the student when he(she) becomes fully English-proficient. Thus, it is not really surprising that the English scores (Vocabulary and Reading Comprehension) have somewhat lower correlations with the Raven than do the Math scores (except for Computation for which a wide variety of past research findings have indicated a lower correlation with measures of academic aptitude than other mathematical skills have). Some support for the hypothesis that the variation in English proficiency among the students in the sample can be expected to attenuate the higher correlation that would exist if all the students in the group were fully English-proficient is provided by the fact that the correlations between Raven and SAT scores are higher in grade 3 than in grade 1; presumably by grade 3 the students whose proficiency in English is most severely limited have made some progress towards full proficiency thus increasing the correlations that were reduced as a result of variation in proficiency.

As can be seen in Table 5.20, intercorrelations among the SAT scores are substantially higher than correlations between SAT and Raven. One possible explanation is that whatever factors tend to affect the achievement in such a way as to make "academic aptitude" a less-than-perfect predictor of academic achievement affect achievement in all subjects in about the same way. These attenuating factors might have any of a number of sources -- for instance, socioeconomic or other environmental circumstances, and they might be manifested in different ways. For instance, the level of motivation to achieve varies from student to student; schools differ in the programs they offer and in the facilities they provide; teachers differ in their ability to teach. All these factors are likely to have much more effect on achievement than on aptitude. Another explanatory factor is the students' varying degrees of limited English proficiency, which, as was discussed above, act to attenuate the correlations of the Raven with the SAT.

Table 5.21 shows SAT (and Raven) means and standard deviations for students at five different levels on the English SOPR total. As was pointed out in connection with the discussion of Table 5.11, "Raven scores are definitely related to mastery of English." An inspection of Table 5.21 reveals that there is an even stronger relationship between SOPR scores and SAT scores than between SOPR and Raven. This table shows that except for a couple of very minor reversals, SAT means consistently increase as the SOPR total increases. There are probably two distinct sources of this relationship. The environmental factors that result in the student's limited-English-proficiency status--for instance the languages spoken by the student's family, friends, and in the student's community generally--would be a first source of this relationship. A student's limited opportunity to

TABLE 5.20. Intercorrelations among SAT scores and Raven total

			CORRELATION COEFFICIENTS										
			ENGLISH			MATHEMATICS							
Grade	N	Variable	Vocab.	Rdg. Comp.	Eng. Total	Concepts of No.	Comput.	Applic.	Comput. + Appl.	Math Total	TOTAL (Eng. + Math)	MEAN	S.D.
1	675	Raven CPM	.278	.273	.304	.388	.322	.398	.398	.416	.390	19.91	5.46
		SAT - Primary 1											
		English											
		Vocab		.624	.865	.668	.419	.646	.585	.654	.818	19.19	6.12
		Rdg.Comp.			.932	.615	.499	.581	.599	.639	.846	23.33	8.50
		Eng.Total				.705	.515	.673	.656	.714	.923	42.52	13.22
		Math											
		Concepts of No.					.644	.786	.792	.927	.884	20.15	6.04
		Computation						.604	.911	.843	.737	13.92	5.03
		Applications							.879	.886	.844	13.02	4.37
		Comput + applic								.963	.878	26.95	8.42
		Math Total									.928	47.10	13.71
		English + Math											
		Total										89.62	24.93
3	511	Raven SPM	.306	.404	.406	.459	.339	.459	.439	.471	.479	27.51	8.15
		SAT - Primary 3											
		English											
		Vocab		.627	.834	.549	.414	.593	.552	.583	.755	16.32	6.27
		Rdg.Comp.			.952	.517	.527	.703	.676	.664	.861	29.78	11.34
		Eng. Total				.580	.534	.729	.694	.698	.904	46.10	16.04
		Math											
		Concepts of No.					.660	.685	.747	.871	.803	18.08	6.29
		Computation						.614	.914	.886	.789	22.69	8.67
		Applications							.881	.870	.874	17.47	7.43
		Comput + applic								.977	.921	40.16	14.47
		Math Total									.937	58.24	19.62
		English + Math											
		Total										104.34	32.88

TABLE 5.21. Means and standard deviations on selected test scores, for groups classified on English SOPR total

English SOPR Total		GRADE 1							GRADE 3						
		S.A.T. - Primary 1							S.A.T. - Primary 3						
		Vocab	Rdg. Comp.	Concepts of No.	Comput.	Math Applic.	Math Total	Raven CPM	Vocab	Rdg. Comp.	Concepts of No.	Comput.	Math Applic.	Math Total	Raven SPM
25	M	25.10	29.10	24.86	16.21	16.27	57.35	21.99	20.27	36.58	21.23	25.82	21.83	68.56	29.82
	σ	5.64	8.85	5.20	4.62	3.96	11.92	4.94	7.16	11.66	5.86	8.61	7.47	19.87	8.43
	N	121	125	124	124	124	124	134	113	124	124	122	123	121	130
20-24	M	20.44	25.14	21.59	14.94	14.26	50.86	20.69	15.74	29.52	18.42	23.19	17.03	58.50	27.81
	σ	5.53	8.15	5.46	4.75	3.70	11.91	5.72	5.58	10.70	5.83	8.24	6.56	17.29	8.05
	N	259	264	266	263	262	262	248	254	257	257	256	255	254	258
15-19	M	16.67	20.53	18.21	12.77	11.29	42.25	19.11	13.93	26.05	15.96	20.36	15.46	51.86	26.62
	σ	4.38	6.75	4.58	4.33	3.39	10.19	5.17	4.06	9.20	6.09	7.50	6.71	17.33	7.11
	N	201	209	209	207	205	205	204	121	131	129	131	126	125	122
10-14	M	15.36	18.40	15.61	10.60	10.12	36.50	17.50	10.29	18.72	12.26	16.23	10.81	39.30	22.50
	σ	3.80	5.92	4.51	5.24	3.71	11.49	5.25	3.23	6.55	3.84	7.44	4.03	12.62	7.31
	N	107	109	108	109	108	107	107	35	43	43	43	43	43	40
5-9	M	12.98	17.15	13.98	10.18	8.44	32.55	17.42	8.12	16.25	13.50	16.25	8.12	37.88	23.29
	σ	2.93	4.82	4.92	4.38	2.80	10.45	5.13	2.23	3.73	5.95	6.56	2.42	10.91	8.64
	N	41	41	40	40	41	40	38	8	8	8	8	8	8	7
Total	M	19.01	23.09	19.91	13.65	12.85	46.49	19.85	15.82	29.25	17.93	22.47	17.13	57.40	27.58
	σ	6.03	8.36	5.96	5.06	4.31	13.57	5.54	6.17	11.41	6.27	8.49	7.30	19.27	8.09
	N	729	748	747	743	740	738	731	513	563	561	560	555	551	557

master English will have an adverse effect both on his(her) SOPR ratings and on achievement in school work taught in English. The second possible source is the fact that both the SOPR and SAT are affected by the student's verbal ability—a factor which will help determine how fast a student with limited English proficiency will learn English. Table 5.22, which presents the correlations between English SOPR and the various SAT variables, provides supporting evidence of the solidity of the relationship.

The fact that almost all of the Table 5.22 correlations are lower for grade 3 than for grade 1 is relevant in this connection. As seen in Table 5.22 the means are higher for English SOPR and the standard deviations are lower for grade 3 than for grade 1. The compression of the SOPR score distribution, as represented by the lower standard deviations, is what reduces the grade 3 correlations. But a low English SOPR score has just as strong a negative effect on test scores in grade 3 as in grade 1. Table 5.23 presents evidence that this is true. In both grade 1 and grade 3, English SOPR is strongly related to SAT scores.

Table 5.23 also shows that the SAT, like the Raven, is not related to the Indian SOPR except in the sense that students known to have had no exposure at all to an Indian language are understandably likely to have a good level of proficiency in English. (Of the 93 students in the Table 5.23 tabulation who have Indian-language SOPR scores of "4," all but 11 are in the top category (19-25) on the English SOPR.) The absence of a close relationship between Indian SOPR and SAT is understandable. Since almost all of the instruction the children receive is in English, knowledge of the Indian language is of no help. Furthermore, the explanation for the analogous finding regarding Ravens and SOPRs (see the Section 5A.3 discussion of Table 5.11 and 5.13) may also throw some light on the lack of a close relationship between SAT and Indian SOPR. Failure to acquire familiarity with an Indian language, in the absence of significant exposure to that language, is no indication that a child lacks either the aptitude or the motivation to succeed in school; furthermore, even if the child does have some exposure to the language, it is unlikely that the schools uniformly put much pressure on their students to master an Indian language.

TABLE 5.22 Correlations of English SOPR Total with test scores

Test score	Correlation with English SOPR Total Grade 1	 Grade 3
Raven*	.225	.230
SAT*		
English		
Vocabulary	.572	.414
Rdg. Comprehension	.429	.461
English Total	.543	.488
Math		
Concepts of No.	.522	.363
Computation	.371	.323
Applications	.543	.394
Math Total	.545	.410
English + Math Total	.591	.482
Mean	19.51	20.35
S.D.	4.55	3.87
N	542	419

*

	Level of test	
Grade	Raven	SAT
1	CPM	Primary 1
3	SPM	Primary 3

TABLE 5.23. Means and standard deviations on selected test scores, for groups classified on SOPR scores

SOPR total scores			GRADE 1							GRADE 3						
			S.A.T. - Primary 1							S.A.T. - Primary 3						
English	Indian lang.		Vocab	Rdg Comp.	Concepts of No.	Comput.	Math Applic.	Math Total	Raven CPM	Vocab	Rdg Comp.	Concepts of No.	Comput.	Math Applic.	Math Total	Raven SPM
19-25	19-25	M	18.6	25.0	20.6	14.3	13.5	48.5	20.8	14.7	30.3	18.4	23.0	17.8	59.0	28.6
		σ	5.2	7.5	4.6	4.9	3.4	10.2	5.4	5.2	10.7	5.7	8.1	6.7	17.7	8.0
		N	125	128	128	127	127	127	114	145	155	156	155	154	153	153
	12-18	M	20.0	24.0	21.2	14.8	14.0	50.2	20.6	15.3	29.9	18.5	23.3	17.2	58.9	28.8
		σ	4.7	8.2	5.1	4.5	3.5	10.8	5.0	5.7	10.8	6.6	8.8	7.0	18.6	7.4
		N	81	81	81	80	80	80	80	65	68	68	68	68	68	70
	5-11	M	22.3	24.8	22.3	14.9	14.7	51.9	20.9	17.7	31.5	20.0	23.4	18.5	61.8	28.4
		σ	5.8	9.1	5.9	5.0	4.0	13.3	5.4	6.3	11.5	6.1	8.4	6.9	18.6	8.5
		N	125	127	128	128	128	128	134	96	99	99	99	96	96	108
	4	M	24.7	29.0	24.6	16.3	16.2	57.1	20.6	22.4	36.8	19.6	26.3	21.2	67.1	28.4
		σ	5.4	7.5	5.3	3.1	3.3	9.3	5.7	6.3	11.2	5.6	7.6	7.8	17.4	8.5
		N	42	43	43	43	43	43	45	36	37	36	36	36	36	35
12-18	19-25	M	15.2	20.2	17.7	12.9	11.2	41.9	19.3	12.7	22.9	15.6	19.9	14.6	49.8	24.9
		σ	3.3	6.4	4.6	5.1	3.1	11.0	5.2	4.2	8.6	6.6	7.5	6.2	17.5	7.0
		N	95	99	99	97	96	96	95	41	49	48	49	49	48	45
	12-18	M	16.1	18.3	16.4	10.9	9.7	37.0	18.2	12.3	24.4	14.9	20.3	14.9	50.3	26.4
		σ	4.0	6.4	4.7	3.9	3.6	9.8	5.7	3.1	9.1	4.6	7.8	6.3	15.6	6.7
		N	70	73	73	73	73	73	75	43	45	44	45	43	43	42
	5-11	M	17.0	21.0	17.2	12.2	10.9	40.1	18.1	15.4	28.1	15.7	18.8	14.4	49.3	26.4
		σ	4.2	7.3	5.0	4.9	4.5	13.1	5.7	3.2	8.7	5.4	7.9	6.0	17.2	8.1
		N	48	50	50	50	49	49	50	17	17	17	17	16	16	18
	4	M	17.8	18.9	16.9	13.0	12.4	42.2	18.6	15.5	23.5	14.0	14.5	12.5	41.0	24.0
		σ	4.5	3.8	3.6	4.8	3.7	7.9	3.5	2.1	4.9	7.1	3.5	12.0	22.6	12.7
		N	8	8	8	8	8	8	9	2	2	2	2	2	2	2
5-11	19-25	M	14.1	16.8	15.1	10.1	9.1	34.5	18.3	9.5	17.1	10.8	13.5	10.1	34.4	25.5
		σ	3.4	4.2	4.2	4.2	2.7	9.0	5.3	3.3	3.6	2.9	4.1	2.8	5.4	6.7
		N	27	28	26	27	28	26	26	10	13	13	13	13	13	14
	12-18	M	13.9	19.0	14.6	10.7	9.0	34.3	17.4	9.6	18.6	11.6	16.1	10.2	37.9	18.0
		σ	3.6	6.0	4.6	5.0	3.7	11.6	5.7	3.7	7.6	4.8	9.8	6.0	18.9	6.6
		N	29	29	29	29	29	29	27	8	10	10	10	10	10	8
	5-11	M	14.4	16.8	13.4	8.9	9.1	32.2	16.7	8.9	16.3	14.7	19.1	8.1	42.0	23.2
		σ	5.2	3.4	4.9	5.0	2.6	11.0	4.2	2.2	3.8	6.0	7.7	3.7	12.7	11.9
		N	12	12	12	12	11	11	10	7	7	7	7	7	7	4
	4	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	M	18.5	22.6	19.5	13.4	12.6	45.6	19.8	15.4	28.8	17.8	22.2	16.9	56.8	27.6
		σ	5.7	8.0	5.7	5.0	4.1	13.0	5.5	6.0	11.1	6.2	8.4	7.1	18.8	8.0
		N	662	678	677	674	672	670	665	470	502	500	501	494	492	499

5C.2 RELATIONS TO COMMUNITY, HOME, AND FAMILY CHARACTERISTICS

In this section we investigate various environmental factors to determine whether they are related to children's academic achievement in school. The factors investigated include such community characteristics as the extent to which the local Indian language is used and such parental characteristics as amount of formal education the parents have had, the language they speak at home, and the family's socioeconomic status. For this purpose, several special composites were developed, primarily on the basis of replies by parents to the Parent Questionnaire and on the replies of community representatives to the Home-Community Language Use Questionnaire.

In interpreting these data it is important to recognize that in most cases it is impossible to determine the extent to which environmental factors affect academic achievement and the extent to which both environmental and academic achievements are caused by a third factor.

a. Home-family variables

Table 5.24 shows the correlations of three home-and-family variables ("Parents' education B," "Parents' use of English in the home A," and "Socioeconomic status") with the various SAT score variables. The parents' education composite called "Parents' Education--B" is a weighted average of the number of years of schooling the parents have had, with a scale value of 14 representing 14 or more years, and with the more educated parent given a triple weighting. The triple weighting was used on the theory that the child will probably learn more from the more educated parent. The "Parent's Use of English in the Home--A" composite, described in detail in Appendix D, section D5, is a 5-point scale from 0 (no English) to 4 (all English). The socioeconomic status composite (see Sections D1, D2, and D3 in Appendix D) is a 27-point scale from 3 to 29 derived from number of years of schooling (unweighted mean of mother's and father's numbers of years) and a parental occupational status variable. If both parents are employed, the higher-status occupation is the one used.

TABLE 5.24. Correlations of selected home-and-family variables with test scores

	CORRELATION WITH					
	Parents' ed. (mean no. of years/a		Parents' use of English in the home/b		Socioeconomic status/c	
	Grade 1	Grade 3	Grade 1	Grade 3	Grade 1	Grade 3
Raven*	.034	.187	-.006	.176	.028	.182
SAT*						
English						
Vocabulary	.219	.279	.390	.318	.253	.295
Rdg. Comp.	.105	.229	.197	.266	.122	.196
English Total	.169	.269	.307	.310	.196	.152
Math						
Concepts of No.	.110	.248	.227	.181	.104	.264
Computation	.101	.215	.193	.119	.147	.235
Applications	.086	.230	.282	.184	.100	.196
Math Total	.111	.264	.257	.183	.129	.263
English + Math Total	.150	.288	.303	.263	.174	.280
Mean	10.72	10.36	2.36	2.48	18.16	18.41
S.D.	3.25	3.51	1.34	1.27	4.52	4.62
N	279	282	299	284	223	189
Absolute value a correlation coefficient must reach to be significantly different from 0 at .05 level**	.114	.117	.113	.116	.131	.143

*	Level of test	
Grade	Raven	SAT
1	CPM	Primary 1
3	SPM	Primary 3

/a Described in Appendix E, Section E3

/b Described in Appendix E, Section E4

/c Described in Appendix E, Section E1

**Using Fisher's z.

The bottom row of Table 5.24 shows, for each column, the lowest absolute value[1] for a correlation to be significantly different from 0. For example, for the correlations with parents' education these critical values are .114 for grade 1 and .117 for grade 3. In grade 3 all the correlations with SAT are significantly different from 0; in grade 1, on the other hand, only the Vocabulary test and the composites into which it enters have significant correlations with parents' education (though some of the other correlations are borderline).

The "Parents' Use of English in the Home--A" composite, described in detail in Appendix D, Section D5, has a significant correlation with every SAT variable in both grades. This is probably attributable to the fact that if the parents use English heavily the children's English will be better, a circumstance which, as suggested by findings discussed earlier in this report, can be expected to have a positive effect on their school achievement.

The findings in Table 5.24 concerning the correlations of Socioeconomic Status with SAT are very similar to the findings for Parental Education. In grade 3 all the correlations are statistically significant but in grade 1 the only significant correlations of Socioeconomic Status are with Vocabulary, the composites into which Vocabulary enters, and Computation. The similarity between the results for Parental Education and for Socioeconomic Status is understandable since the former is one of the two components of the latter.

In summary, of the three home-and-family variables included in Table 5.24, parents' use of English in the home is clearly the one with the strongest relation to grade 1 scores, but its importance, at least for the math scores, diminishes as the children progress in school and as those whose knowledge of English is weak gain proficiency in the language.

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[1] An absolute value is a value with minus sign ignored. Thus both .406 and -.406 have an absolute value of .406.

b. Community use of the Indian language

In Table 5.25[1] we bring another variable into the picture: community use of the Indian language. This table shows the intercorrelations of the community language use variable, project means on the three home-and-family variables of Table 5.24, and project means on test scores. There is a separate correlation matrix for each grade in which the project, not the individual student, is the "case." It is immediately apparent that these correlations are far higher than the ones in Table 5.24. The difference reflects the fact that Table 5.25 contains correlations of project means and that these means are based on more homogeneous groups (the students within a project) than Table 5.24, which is based on the total group of students. Because of this magnification of relations, Table 5.24 probably shows the picture more clearly than does Table 5.25. Parents' use of English in the home is again shown to have a higher relation in grade 1 to SAT scores than does either of the other two home-and-family variables; in Table 5.25 this shows up in grade 3, too, except for the computation score (the most nearly language-free test in the SAT).

As for community use of the Indian language, this variable has numerically higher correlations with the grade 1 SAT scores than do any of the home-and-family variables. The correlations of the community language variable are all negative because this variable is oriented so that a high score represents less use of English. But for this variable, too, the correlations tend to decline by grade 3, presumably because other linguistic influences, such as studying English in school, are having an effect; home and community no longer have such a near-monopoly in affecting the child's linguistic development.

As in Table 5.24, the bottom row of Table 5.25 shows the lowest absolute value a correlation must have to be significantly different from 0. It should be noted that none of the correlations with the Raven differs

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[1] The complete tables from which this smaller table has been extracted are Tables G.4a (for Grade 1) and G.4b (for Grade 3) in Appendix G.

TABLE 5.25. Correlations of community use of Indian language with project means on SAT scores and selected home-and family variables*

VARIABLE	CORRELATION COEFFICIENTS											
	Grade 1				Grade 3				Grade 1		Grade 3	
	A	B1	B2	B3	A	B1	B2	B3	Mean	σ	Mean	σ
A. Community use of Indian Language	(1)	-.71	-.89	-.50	(1)	-.45	-.90	-.24	-.84	4.61	-1.00	4.64
B. Home-and-family variables												
1. Parents' Education - B	-.71	(1)	.74	.76	-.45	(1)	.45	.50	10.67	1.44	10.71	1.52
2. Parents' Use of Eng. in Home - A	-.89	.74	(1)	.57	-.90	.45	(1)	.33	2.53	1.03	2.69	1.05
3. Socioeconomic Index	-.50	.76	.57	(1)	-.24	.50	.33	(1)	18.28	1.87	18.65	1.90
C. Stanford Ach. Test: Adjusted Scores												
1. English												
a. Vocabulary	-.80	.68	.75	.52	-.64	.45	.62	.38	21.19	4.15	16.64	4.13
b. Rdg. Comprehension	-.69	.56	.54	.30	-.58	.45	.61	.37	24.31	5.82	30.49	6.34
c. Total	-.75	.61	.63	.39	-.64	.47	.64	.39	45.95	9.38	46.98	10.08
2. Math												
a. Concepts of No.	-.74	.58	.67	.44	-.44	.40	.49	.37	21.36	3.67	18.01	3.26
b. Computation	-.58	.36	.45	.22	-.36	.33	.40	.46	13.90	2.76	22.05	4.55
c. Applications	-.75	.60	.71	.43	-.54	.36	.58	.29	13.74	2.84	17.56	3.93
d. Total	-.74	.55	.64	.39	-.47	.37	.52	.39	49.07	8.78	57.52	11.11
3. English + Math Total	-.76	.57	.63	.39	-.57	.42	.59	.40	96.07	17.13	104.25	20.46
D. Raven Total	-.29	.37	.35	.31	-.19	.34	.40	.38	19.64	2.38	27.70	3.57
NO. OF CASES (Projects)	21-24				21-23				21-24		21-23	
Absolute value a correlation coefficient must reach to be significantly different from 0 at .05 level**	.43-.40				.43-.41				.43-.40		.43-.41	

*Data in this table have been extracted from Tables G.4a and G.4b.

**Using Fisher's z.

significantly from 0 but that most of the other correlations do. This indication of the Raven's resistance to the effects of environment constitutes supporting evidence that it is performing its intended function in the project; i.e., providing a measure of academic aptitude which can be used as a control variable in determining the effect on academic achievement of various instructional approaches.

Further evidence of the significance of the relationship to Raven scores is shown in the Table 5.14 analyses of variance.

5C.3 RELATIONS TO INSTRUCTIONAL VARIABLES

Tables G.4a and G.4b[1] (for grades 1 and 3 respectively) show the intercorrelations among project means on various instructional variables (e.g., hours per week of instruction in various subjects, languages used in instruction, service cluster, etc.), Raven total, SOPR scores, community use of the Indian language, and the "outcome variables" (Stanford Achievement Test scores).

The picture that emerges from a study of these tables suggests that instructional assistance for LEP children, in the form of special instruction in English, use of the Indian language or simplified English in instruction, and teaching of the Indian language, is going to the children who are most in need of such help; i.e., the children whose SAT scores are low, probably at least in part because of lack of proficiency in English. Of course the opposite explanation, that the extra help is causing the low scores, is also a possibility, but it seems a very unlikely one. Evidence that the children whose SAT scores are low are the ones on whom the special help is concentrated lies in the substantial negative correlations between SAT scores and such variables as hours per week of special English instruction, percentage of use of the Indian language in instruction, percentage of use of simplified English, and the teaching of the Indian language. These negative correlations are the ones in rows A2, A4, A5, A6,

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[1] These two tables are in Appendix G.

C1, C2, C3, C4, and C5 of the tables. Supplementary evidence lies in the positive correlations between major cluster (row D) and the SAT scores. (Major cluster has been recoded as shown in the second footnote to Tables 5.17a and 5.17b, so that the scale runs from 1, representing nearly 100 percent use of the Indian language in instruction, to 5, representing nearly 100 percent use of English.)

Hours of instruction in math (row A7 of the tables) is substantially correlated with the SAT scores (not only math but also Vocabulary and Reading) in grade 1, but those correlations surprisingly drop to about zero in grade 3. The correlations with hours per week of math instruction in English are solidly correlated with the SAT scores. No ready explanation of the near-zero correlations in grade 3 row A7 comes to mind; further investigation seems in order.

Turning again to the grade 1 hours of instruction in math, the fact that this variable has even higher correlations with the SAT Vocabulary and Reading Comprehension scores than with the math scores at first glance seems somewhat surprising. There is a reasonable explanation, however; it lies in the high correlation (.66) between hours of math instruction and hours of regular English reading instruction. Students who are receiving a lot of math instruction are probably also receiving a lot of reading instruction. Once again we are reminded that concomitance is not causation!

In the preceding section, ("Relations to Community, Home and Family Characteristics"), we discussed two tables (Tables 5.24 and 5.25) in which correlations of about the same set of variables were provided, but in one table individuals' scores were the bases of the correlations while in the other table project means were correlated. For readers interested in further comparisons between correlations of individuals and correlations of means of groups (e.g., project means) Tables G.5a and G.5b (for grades 1 and 3 respectively) are provided in Appendix G. In examining these tables it should be borne in mind that if the individuals in a subgroup (e.g., students in the same project) are more homogeneous than the total group of individuals (e.g., students in all projects combined) ,there is a strong tendency for the correlations of group means to be higher than the corresponding correlations of variables for the individual (Shaycoft, 1962). Inspection of Tables G.2a and G.2b reveals that, on most variables, the within-project standard deviations tend to be definitely smaller than the corresponding overall values. Perhaps the most striking finding in Tables G.5a and G.5b is the sharp rise in grade 1 correlations between hours per week of math instruction and the various SAT scores where we shift from student correlations to project correlations. This finding suggests that amount of math instruction has a potent effect that is largely masked by inter-student variability when we just look at student correlations.

Therein lies the key, in all probability, to why the project means, when correlated, in some ways give a clearer picture of the direction and relative magnitude of project effects than correlations of individual scores provide; the project means eliminate the masking effect of inter-student variability. Therefore, our analytic plans after the second year of data collection include doing correlational analyses both ways -- by student and by project.

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Appendix A. DESCRIPTION OF CALIFORNIA PROJECTS

A1 1. INTRODUCTION

For the purposes of this study the Title VII Native American projects in California were treated separately from the projects in other states. The decision to treat the California projects apart was based on the review of project files at OBEMLA for all Native American projects and the results of a telephone survey of all such projects. From the information contained in project files and that provided by Title VII project directors, it appeared that the California projects were significantly different from most Title VII Native American projects elsewhere in the country, and that the evaluation design to be used elsewhere was not suitable.

It appeared that the California projects typically consisted of individualized services provided by itinerant tutors to relatively small numbers of widely dispersed Indian students. One project, for example, indicated that it served approximately 300 students located in 104 schools in 11 separate school districts. Available information indicated that, in all the California sites, there were few students of the same grade in the same school receiving project services and that the longitudinal evaluation design, with its assumptions of group administered testing and relatively substantial and consistent exposure to project-supported instructional treatments, was not appropriate.

Consequently, it was decided that three of the six California projects would be visited by a senior member of the study's staff for 2-4 days. Since one of the six had refused to participate with the study in any way, including responding to the telephone interview, selection of sites was from among the remaining five. Of these five, all indicated that increasing Indian students' English proficiency was a primary goal of the project. Through the Title VII project, all provided special instruction in English, all provided instruction in Native American history and culture, and three of the five indicated they provided instruction in the language arts of at least one Native American language. In addition, all of the projects served a group of Indian students with little or no proficiency in an Indian language and who, in four of the five cases constituted a small minority of their school district's enrollment. In no case did staff indicate that their students spoke an Indian language at home "all or almost all of the time," and in only two of the five did staff indicate there were any students who spoke "a mixture of English and an Indian language at home." Rather, staff reported that the students in the project spoke a non-standard form of English because of their Indian heritage and that they were in need of remedial assistance.

The purpose of the site visits was to document the services being provided, the characteristics of the students served, and student outcome or impact data if any were available. Of the three projects selected, one declined to participate on the grounds that the burden on project staff would be too great. The other two projects participated fully in the study. The visits were made during late May and early June of 1986. This was near the end of the third year of operation of one project and the second year of the other. These two projects, one in the San Francisco Bay area and the other in a large northern county, were similar in many important respects to the other California projects.

Prior to describing the two California projects, it seems worthwhile to provide a brief overview of the historical and social context of Native American projects in California. The Native American population in California has had a substantially different experience than elsewhere in the United States, and it is to be expected that projects serving them might differ from those elsewhere.

2. CONTEXTUAL OVERVIEW

Before Europeans entered what is now known as the State of California, a diverse Indian population inhabited the area. These Indians differed greatly among themselves in customs and languages. The exact size of the pre-colonial indigenous population is unknown, and estimates vary. For example, Powers (1976) estimated the pre-European population at 705,000, while Kroeber (1971) calculated the population at 125,000 and Cook (1976) claimed it was higher, at 275,000. As discussed below, various factors associated with European colonization resulted in a substantial decline in the size of the Indian population. By 1950, census data revealed there to be only 19,947 Indians in the state (Heizer & Whipple, 1971). However, as a result of emigration to the state of Indians from elsewhere in the United States and Canada and increased self-identification as Indian, the number of Indians had increased to 231,702 as of 1980, as shown by Census data.

Linguistic research indicates that there were as many as eighty different languages spoken in California before European contact (Heizer 1978). Presently seven main language stocks are recognized in the state: Athapascan, Algic, Yukian, Lutuamian, Hokan, Penutian and Uto-Aztecan (Dixon & Kroeber, 1971). Each stock contains a number of languages and dialects. Heizer (1978) states that approximately twenty-four of these languages are still used today.

California Indians' first contact with European culture, specifically Spanish-Mexican culture, came with the establishment of Franciscan missions along the central and southern coastline in the 1770's. These missions attracted entire tribal populations from their aboriginal homelands onto the lands surrounding the missions. This new environment greatly changed the way of life of the natives. For example, archeological and linguistic evidence indicates that aboriginal customs faded out and tribal organizations and languages intermingled (Heizer, 1978). In addition, as a result of such factors as changes in diet, disease, crime, alcoholism, and interbreeding, there was a great reduction in the overall size of the Indian population. Later, secularization of the missions by the Mexican government and the increasing encroachment of Mexican and American ranchers and agriculturalists decreased the population even more. However, the greatest decline in the Indian population was caused by the Gold Rush of 1849.

Most of northern California, however, was not affected by the Franciscan missionaries. In fact, Europeans did not settle in this area until the first half of the nineteenth century, with the onset of fur trading and gold mining. Beginning at this time, Indian reservations were established on which Indian people were forced to resettle. In many cases, different tribes with different languages and customs were indiscriminantly mixed together on a single reservation.

As American settlements increased during the late 1800's, the remaining Indians were moved onto small and scattered reservations, with each reservation separate and unique. Factors, including water supply, land quality and quantity, population and proximity to White settlements, varied from one reservation to another. Yet sociopolitical and economic conditions were similar. At first, these Indians supported themselves on their reservations. However, productivity declined and in many cases tribal governments were destroyed when reservation land was divided by the Bureau of Indian Affairs into tracts to be owned by individual Indians. Eventually, in most cases off-reservation work was increasingly sought, and rancherias and reservations became refuges for the unemployed and retired.

In the early twentieth century, when the larger reservations were terminated, most of the resulting landless Indians established rancherias on white-owned land, where they worked cheaply as agricultural laborers. As they became more familiar with the dominant Anglo culture, the rancheria system began to prosper, and the Indians actively participated in improving their own health, education and welfare conditions.

At present there are nearly one hundred widely-scattered Indian reservations and rancherias (group homesites) in California. Today's remaining rancherias are organized as independent political units, each with an official who acts as a liaison with government agencies. However, the trend toward urban living continues. In 1980, 83% of the California Indians lived in urban areas, with 42% living in the greater Los Angeles-Long Beach-Anaheim SCSA and 16% in San Francisco-Oakland-San Jose. Figures indicate that Native Americans are among the most unemployed and poorest groups in the state, with unemployment and poverty rates nearly double those of the population as a whole (1980 census).

In recent years the Indians in the Bay Area, a small number of descendants of the original residents and the more numerous Indians from elsewhere who have migrated to the region, have united into corporate entities. Some of these Indian organizations have taken militant Indian rights positions, with the take-over of Alcatraz Island being most notable. Other groups have adopted purely service or social orientations. The present condition of the Indian people in the Bay Area is somewhat better than that of the Indian population state-wide, but is nevertheless characterized by high unemployment, low incomes, and poor housing.

Throughout the state, in recent years, there has been a resurgence of Native American interest in their own languages, history and cultures and in maintaining their unique identities (Heizer 1978). Although many traditional customs have disappeared, efforts are being made by California's Indians to strengthen their ethnic identity and to unite the dispersed members of Indian tribes.

A3 3. PROJECT DESCRIPTION: MENDICINO COUNTY SCHOOLS

a. SETTING

The project was administered by a county office of education in a large, primarily rural, northern California county. The county office is a support service organization for 11 school districts and 40 schools. The local districts are autonomous units which operate the K-12 programs in their jurisdictions. The county office administers region-wide programs at the discretion of the local districts, performs state-mandated reporting functions, and operates instructional programs for out-of-school youth at the county jail and other non-school settings. Relationships between the county office and local districts were such that the Title VII program could function smoothly and with full local support in some parts of the county and not at all in others.

According to the Title VII project proposal, the county has over 1000 Indian students with significant representation of 7 tribes and 15 language groups. Many of these students live in small Indian communities or rancherias in the rural sections of the county, although some live the county's few large towns. The Pomo languages are predominant among the Indian students, but other language groups reported to be represented by at least several Indian students are: Yuki, Wilaki, Cahto, Nomlaki, Maidu, Hoopa, Yurok, Karok, Miwok, and Sioux. Virtually all of the Indian students speak English at home and consider English to be their primary language. Indeed, linguistic research literature indicates that there are no longer any fluent speakers of some of the reported languages (e.g., Maidu and Nomlaki), but it has been reputably reported that virtually every Indian child in the county has relatives who speak one or more of the Indian languages. Some of the children live in households where an Indian language is spoken frequently, still more live in communities where their Indian language is regularly used as part of their ceremonial life, and most of the rest are raised in communities where at least most of the adults with whom they are in daily contact speak a non-standard form of English.

Several of the local school districts received bilingual education program funds from the State of California; all received federal funds through Chapter 1 and Chapter 2; and one received funds from Title IV (Part A) of the Indian Education Act. It was reported that in the past other districts had received funds through the Indian Education Act but had decided against continued participation because they did not want to segregate their Indian students by providing services exclusively to Indians and they objected to the required documentation and other paperwork. Virtually none of the students receiving services through the Title VII project were eligible to participate in the State of California bilingual education programs.

b. PROJECT PURPOSE AND OBJECTIVES

The Title VII project began operations in the fall of 1984, with a grant for the 1984-85 school year of $242,782. A second grant was received for the 1985-86 school year in the amount of $238,827. A grant for a third year of operations in approximately the same amount was submitted to the Department of Education but rejected; thus the project operated for two school years. The project was designed and approved to serve 450 LEP Indian students representing seven different language groups (Pomo, Yuki, Wilaki, Cahto, Nomlaki, Maidu and Sioux). These students were enrolled in grades K-12 in four of the ten districts within the county.

The stated objectives of the project were to increase the English language proficiency and academic growth in reading, language and math of participating students at a rate greater than non-participating students. It was also the explicit intent of the project to enhance the self-esteem of Indian students, to increase Indian parents' involvement and support for education, and for teachers to provide more culturally related instruction for Indian students. Integrally connected with these objectives was the project's intent to develop instructional materials, largely computer assisted instructional materials, which related local Indian history and practices to the academic program of the schools. More specifically, the eight goals and objectives of the project as contained in district prepared materials were:

1. Goal: To raise the level of academic achievement for Indian students through increased English fluency.

   Objective: By June of each year, 90 Indian students in grades K-12 who score below the 25th percentile on standardized tests shall achieve 80% of their objectives in reading, math and social studies as specified on an Individual Assessment Plan (IAP).

2. Goal: To develop an awareness of high technology careers; to raise the level of academic achievement; and to enhance self-esteem.

   Objective: By June of each year, 30 Indian high school students will provide cross-age tutoring and computer assistance to 120 Indian students in grades K-8 with the result of improving English proficiency, basic academic skills, career awareness, and self-esteem.

3. Goal: To develop fluent English proficiency and to reclassify LEP students as FEP (i.e., "fully-English-proficient") students.

   Objectives: Throughout the year students who pass district criterion tests and are judged no longer LEP are phased out of the Title VII project.

4. Goal: To increase the number and percentage of Indian students graduating from high school.

   Objective: By June each year there will be a 10% reduction in the dropout rate of 40 Indian students in grades 7-12 participating in direct counseling services.

5. Goal: To increase the districts' capacity for meeting the needs of LEP Indian students.

   Objective: By the start of the second school year, 30 classroom teachers, 10 administrators and the Title VII project staff will have successfully completed project training activities.

6. Goal: To increase the level of Indian parent and community awareness, understanding, involvement and support.

   Objective: By the end of the project's first year there will have been an increased level of communication and support between educators and the Indian community.

7. Goal: To develop culturally based curriculum materials that are articulated with the districts' regular instructional program.

   Objective: By the start of the second school year there will be a culturally based curriculum that is articulated with the basic school program of participating schools and districts.

8. Goal: To develop an interactive video computer learning system for teaching Indian languages and culture.

   Objective: By the start of the second school year there will be developed an interactive video computer learning system for teaching Indian language, culture and academic basic skills.

An interview with the assistant superintendent who was responsible for writing the original grant and supervising the project during its first year provided additional insight into the project's objectives. From his perspective, the overall goal of the project was to bring about lasting change in the way Indian students were taught by integrating computer technology, basic skills instruction and Indian culture in a way that fit the overall instructional pattern of the county's school districts. The project included a major focus on the development of instructional software so that there would be something tangible and attractive enough for teachers to pick-up and use after the project was gone.

c. PROJECT ENTRY REQUIREMENTS

The project had six criteria for use in identifying Indian LEP students. The criteria were made available to participating schools and their application reviewed by project personnel. To be defined as LEP for program purposes, an Indian student had to meet two of the six basic criteria. The six criteria are listed below; it was assumed that a student who did not meet one of the parts of criterion 1 was considered to be an Indian by school personnel on the basis of community reputation.

1. Native language/tribal background:
    a. 506 Form on file (this is the identification form used by programs funded under the Indian Education Act);
    b. Pomo spoken in the home;
    c. Cahto spoken in the home;
    d. Any one of 7 languages of the Round Valley Reservation spoken in the home; and
    e. Identified language interference.
2. Below Q2 (40% tile) on any district standardized test.
3. Failure on any one district proficiency test in language, reading or math.
4. Two grade levels behind in any academic subject.

5. Retained, conditionally or unconditionally, for one or more years.
6. Absent 10% or more of the actual school days.

From those students identified as LEP, priority in the delivery of services was to be given to students meeting any one of the following conditions:

- Referred by parent, teacher or other responsible person;
- Enrolled in or eligible for services from a "community school" (i.e., a school associated with county correctional system and operated by the County School Office);
- Two grade levels behind in any academic subject;
- Lives on a reservation or rancheria;
- Below the 20th percentile on any district standardized test;
- Resides in a juvenile hall or under the jurisdiction of the courts;
- Identified drug or alcohol abuse; and
- Pregnancy.

As discussed more fully below, these criteria were used to identify groups of students and to assign priorities for levels of service within these groups. As a matter of project and local district policy, all students enrolled in the classes of participating Indian students received at least some minimal services through the project. Project and school district personnel as well as some Indian parents argued forcefully that it would be dysfunctional to provide services only to Indian students. They argued that this would reinforce negative stereotypes of Indian students and thus adversely affect their academic progress. Instead, they implemented a policy of employing Indian tutors and computer assisted instruction (CAI) aides who provided services to all students in the classrooms in which Indian students were enrolled.

d. SERVICES OFFERED

Consistent with the project's strategy and objectives, considerable resources were devoted to developing computer software packages which could be used in instruction; software was also developed to assist in project management and as part of community involvement efforts. The other major focus of project activity was in the classroom. Instructional aides were employed and assigned to one or a small cluster of schools, and senior project staff provided special programs on local Indian history and culture at teachers' requests in their schoolrooms and at teacher orientation meetings. Although some activity was devoted at the secondary school level, most effort focused on the elementary schools.

ELEMENTARY SCHOOL PROGRAMS

Essentially, the project operated with two instructional models. In some schools the project operated an instructional laboratory and in others it provided individual learning stations. The model used was dependent on the preferences and physical arrangements of the differing schools. In both cases, the development of individualized educational plans (IEPs) and the use of computer-based individualized instruction was central.

Learning Laboratory Model: Typical of the learning laboratory model was an elementary school in a small town about 40 miles away from the project headquarters. The project operated in an elementary school (K-7) of 320 students serving an area of 420 square miles. About 80% of the students were bused to school. About 50 of the students were Indian, 75% of whom were Cahto and living on the Cahto rancheria which was several miles outside of town.

According to the school principal, there had been a long standing pattern of prejudice and discrimination against Indian students in the school district which led to poor academic performance and high drop out rates. The principal had been in the district for over 20 years and from his perspective the Title VII project was the first special effort which he believed was really improving conditions for Indian students. He argued strongly that an essential ingredient of the project in his school was that it served all students in grades 2 through 7, Indians and non-Indians alike. Aside from the academic instruction provided, in his view it was extremely important that non-Indian students experience being taught by a competent Indian teacher (i.e., the Title VII aide) and that the non-Indian parents perceive that their children were benefiting academically by the presence of Indian students in the school. After two years of the project, the principal could site examples of what he believed were evidence of positive changes in teacher and school community attitudes toward Indian children.

Procedurally, the project activity in the school was located primarily in one large room which was designated the computer learning laboratory. The Title VII aide operated the laboratory. She was a prominent member of the Cahto Indian community, had previous experience as a Title I aide in the schools, and had received several months of project instruction in the use of the computer equipment and instructional programs. In a typical week she met with 290 students in groups of 10 for 40 minute instructional sessions. She met with each student approximately the same number of days each year, but the intensity of contact varied by grade and classroom teacher preference. For example, she met with 4th graders once every three weeks all year, while she met with 7th graders every day during a five week period. After an initial session focused on basic computer literacy and the development of IEPs, students worked on English language arts or math programs at their own appropriate skill level, with the Title VII tutor assisting as needed both with instructional content and procedures. Teachers of the 3rd and 5th grades were interviewed at the school and indicated that the instruction provided by the project was supplemental to their regular instructional program and of benefit to their students.

Instruction in Indian language and culture was not an explicit part of the project. Elements of Indian history and culture were integrated into the instructional software packages used by all students, however. Thus, reading lessons frequently included Indian stories, both traditional and modern; and math lessons occasionally used symbols of traditional Indian rather than European or modern American artifacts in word problems and similar activities. Indian students spoke only English at schools and in the general community, although tribal leaders indicated that the Cahto language was used for ceremonial purposes and in some discourse on the rancheria. The principal and several teachers indicated that while they did not know which, if any, of their students spoke an Indian language, the Indian students did have language patterns which were distinct from standard English and did require remedial assistance.

Individual Learning Station: In this model a computer or two was located in each classroom and the Title VII project aide came to the classrooms on a set schedule to work individually with students. As in the laboratory model, services were provided to all students, but in this case preferential treatment (i.e., more time) was given to Indian students identified as LEP. Reportedly typical of the learning station model was an elementary school located in the county seat. That school had the largest number of Indian students in the city and the only state-funded bilingual classroom (integrated K-4). Each classroom in the school had at least one computer, six of which had been provided by the Title VII project.

At the start of the school year the Title VII aide gave an orientation session on the computers and available instructional software to teachers and all students in each of the classes. From then on she focused her work on 31 Indian students in seven classrooms. An individual education plan (IEP) was developed for each of the Indian students at the start of the year and then individualized computer assisted instruction provided. The role of the aide was to select appropriate software, work with the student during the tutorial sessions, and monitor student progress in conjunction with the classroom teacher. Periodically, the IEP would be reviewed by the classroom teacher and a senior member of the Title VII project staff. The time devoted to each student varied somewhat, but averaged about 40 minutes per week.

When the tutor was not working in a particular classroom, the computers and software were available for use by all children in the room. According to several teachers interviewed, the computers and software were extensively used by Indian and non-Indian students when the tutor was not present and the singling out of Indian students for special tutoring did not pose any discernable problems.

As in the other school, Indian language and culture was integrated into the computer materials but otherwise not an explicit aspect of the project. As a supplement to the computer assisted instruction, however, the Title VII aide also provided presentations of Indian culture to classrooms as part of their social studies offerings. According to school personnel and project staff, Indian languages were less used by students in this school than in the more rural setting. Indeed, the school's bilingual education project teacher (a young, California-certified bilingual teacher with several years experience) stated she had discerned no language interference in the Indian students in the school.

SECONDARY SCHOOL PROGRAMS

Although the project design focused primarily at the elementary school, there were some secondary school level activities. During the summer some students were provided tutoring and other project related opportunities to work with younger students in a peer tutoring context. Some project staff time was devoted to counseling and tutoring activities with Indian students at various high schools in the county; programs were offered through the county's correctional facilities; and a program was operated on the Round Valley Reservation as part of the county's community schools program. According to project staff, the community school program located on the Round Valley Reservation was the most noteworthy secondary school effort. That program was operated out of a storefront in the small town on the reservation for students who had dropped out of or who had been expelled from the local high school. The project provided an Indian teacher, computer equipment and instructional software for the school program. The students in the program were at varied academic levels and stayed in the program for varying lengths of time. A goal of this activity was to assist students to obtain a high school diploma directly through the project or to return to the regular high school. At the time of a site visit to the community school in May 1986, there were three students enrolled (two 16 year olds and one 15 year old). Two weeks previously there were eleven enrolled, but eight of those students were incarcerated at the county's juvenile hall at the time of the visit, with two or three of those reportedly continuing their instructional program from that setting.

As with the elementary program, Indian language and culture were integrated into the instructional materials used, and the staff employed were Indians who spoke one of the local Indian languages. In addition, students were encouraged to write autobiographically, emphasizing their Indian heritage, and the project was experimenting with developing a system of encouraging Indian students in one part of the county to communicate with Indian students in other parts through the projects' computers.

MATERIALS DEVELOPMENT

Project staff considered this to be the most important Title VII activity because they believed it would have a lasting impact on the district and they hoped it would be of assistance in teaching Indian students elsewhere as well. Consequently, substantial project resources were devoted to developing an extensive set of computer assisted curriculum and project operational materials. The materials were developed to function on either Apple or Atari hardware.

By the end of the second school year, the project had developed 78 computer assisted instructional programs. All instructional materials were developed by skill level rather than grade and were designed to be suitable for students ranging from kindergarten through adult. The instructional materials packages covered the following areas:

- computer literacy
- English as a second language
- word processing
- English reading
- math, through algebra

In addition, the project developed teacher training, student diagnostic and program administration packages on computer disks which could be used in all schools in the county. They also believed the materials could be easily modified to be useful in Indian programs throughout the United States. The packages which had been developed by the end of the second school year were:

- A district-level technical assistance and orientation package,
- A parent information and parenting skills package for use by parent groups (e.g., Tile VII parent committees, PTAs),
- A teacher training package, including materials about teaching Indian students, and an orientation to English as a second language, and,
- A student skills analysis package, with the materials needed to develop and record an individual education plan tailored to the computer assisted instructional materials.

In addition, the project had developed Indian language, social studies, and U.S. history packages which are tailored to Indian students in northern California.

e. PROJECT RESULTS

Project evaluations which focused on achievement of the project's specific objectives were conducted by a third party evaluator. These reports as well as observations and interviews while on site indicate that the project was being implemented according to plan; that students were receiving computer assisted and other instruction, particularly in English and math, who would not have done so without the project; and that a great deal of computer based instructional material had been developed. Due to the lack of baseline and other necessary data, no statistically based conclusions regarding the project's effects on students can be drawn. Teachers and principals said they believed there were academic gains as a result of the project, but they had no empirical data to support their views.

4. PROJECT DESCRIPTION: SAN LORENZO SCHOOLS

a. SETTING

The project was located in a small school district on the southeastern shores of San Francisco Bay. The district has a total enrollment of approximately 7,500 students, 240 of whom are American Indians. There are nine elementary schools and two high schools in the district. School officials characterize the district's population as "working class," with a large number of single mothers, many of whom receive public assistance.

According to reports submitted by the district to the State of California, there are approximately 350 limited English speaking (LEP) students in the district. Approximately 190 of these are elementary school students and 120 are in junior or senior high. The predominant native language of the LEP students is Spanish, but 32 languages in all were reported. The district has a state-funded "bilingual education program" to provide special language related services for these students.

In 1986, none of the students reported to the state as LEP spoke an American Indian language. In 1985, one student designated for state purposes as LEP spoke "Sioux," but by 1986 that individual had moved back to South Dakota.* According to district staff, the Indian students in the district are from a wide variety of tribes, about a third from within California and the rest from other parts of the United States.

The district has received grants under Title IV (Part A) of the Indian Education Act since the early 1970's. It has also received funds for disadvantaged and other students with special needs through Chapter 1, Chapter 2 and other federal and state programs.

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* Project staff point out that at this time the state does not provide a definition of Native American LEP students.

b. PROJECT PURPOSE AND OBJECTIVES

The Title VII project began operations in the fall of 1983, with a grant for the 1983-84 school year of $68,666. A second grant was received for 1984-85 in the amount of $62,075 and a third year grant of $67,815 was received to cover the 1985-86 school year. The district initially proposed that the project serve 120 students, but as a result of negotiations with the Department of Education, the initial grant was to provide services to 60 students in grades 4-7. The grants for years 2 and 3 were to serve 70 students in grades 3-7. These students were in four of the district's nine elementary schools and its two high schools.

According to the public information brochure on the project distributed by the school district, the project was "designed to serve English-speaking Indian students that come from a differing language or cultural background." The more specific goals and objectives of the project included in the proposal to the Department of Education were as follows:

- Goal: "Students will be consistently successful in the regular classroom because they are English proficient."

  Objective: 50% of the students showing a gain of five months on the California Test of Basic Skills (CTBS) in reading and language arts by June of each year and after completion of 60 hours in project services.

- Goal: "Students will have knowledge of ancestral language and culture."

  Objective: 50% of the Indian students participating in the cultural and language classes will demonstrate an increase of 50% in Indian language ability by June of each year as measured by pre and post tests.

- Goal: "All staff persons will be qualified bilingual personnel."

  Objective: project staff will demonstrate increased knowledge of teaching culture, language and computer skills to students and adults each year.

- Goal: "Pride in ancestral languages and culture will be maintained for the children by preserving it in writing."

  Objective: Staff will develop ancestral language curriculum materials to be used in classes.

- Goal: "Parents/Community are involved in planning, implementing and evaluating the Bilingual programs."

  Objective: There will be a formal communications system linking the Indian parents, students, community and project personnel.

c. PROJECT ENTRY REQUIREMENTS

The project proposal defines a student eligible to participate in the Title VII project as an American Indian who does not do well on the CTBS test (p.5). The proposal goes on to indicate that although the mean CTBS score for the district is 50%, over half of the Indian students are below that level and 30% of the Indian students score below the 35th percentile. Operationally, an eligible student (i.e., a student defined as LEP for the purposes of this project) was an American Indian who scored at or below the 35th percentile on the CTBS and who failed the districts language proficiency test or who was referred by parents, teachers in school administrators, or who had an unusually high rate of absenteeism. At the time the proposal was written, there were 120 such students (out of the 274 Indian students in the district), with 60 of them being in grades 4-7 in the project's four target schools. The operational definition of an Indian student was a student determined to be eligible for assistance under Title IV, Part-A of the Indian Education Act. Discussion of the eligibility requirements with project staff and the director of the district's state bilingual education program indicated that there was no attempt to relate the state definition of a LEP student to eligibility in the Title VII project.

d. SERVICES OFFERED

Consistent with the project's objectives, the major services offered to eligible students were supplementary academic instruction and exposure to American Indian language and culture. The Title VII grant provided the services of a half-time project coordinator, a full time resource teacher, a part-time tutor, and Indian culture and language consultants. The grant also provided English language arts and Indian language and cultural materials as well as some computer software.

ACADEMIC INSTRUCTION

Supplementary academic instruction was provided through the project in the four elementary and two high schools. The basis of the instruction was a student needs assessment packet through which classroom teachers indicated what, if any, project provided assistance they believed would benefit Indian students in their classes. Teachers could select one or two areas from a list of 27 which they thought would be most helpful to the student, and then could indicate whether they recommended individual or small group instruction and whether computer assisted instructional approaches should be used. The categories in which tutorial assistance was offered were:

- English oral language skills
- English writing skills
- Spelling
- Reading
- Math
- Social studies
- Self esteem
- School survival skills

At the elementary schools, students were provided tutorial assistance for one-half hour twice each week. Approximately one-third of the tutoring was computer assisted and two-thirds involved individual sessions with the project resource teacher or tutor. The tutors had 26 software programs available to them for use in the tutoring sessions. Approximately three-quarters of the assistance was with English language arts and one/quarter with math, primarily with word problems. At the high school, the students were provided one hour of tutorial assistance each week from either the resource teacher or tutor. Again, the primary emphasis was on English language arts, but some help was provided in mathematics.

Many of the worksheets and readings used in the tutorial sessions included Indian characters or artifacts, and the tutors had access to two computer software packages which introduced students to reading and writing basic words in Lakota and Cherokee. Neither the resource teacher nor the tutor, however, were Native Americans, nor did they speak an Indian language.

As shown in Table A.1, below, during the 1985-86 school year, supplementary academic instruction was provided through the project to 30 Indian elementary school students and 14 Indian high school students.

TABLE A.1. Students receiving supplementary instruction during the 1985-86 school year

School	Grade range	No. of Indian Students	Comments
Elementary 1	3-7	12	plus 2 non-Indian ex-LEPS
Elementary 2	3-6	11	plus 2 non-Indian ex-LEPS
Elementary 3	2-6	5	
Elementary 4	5-7	2	
High School 1	8-12	7	
High School 2	8-12	7	

CULTURE AND LANGUAGE

Many of the Indian language and culture activities were coordinated with and supplemental to services provided through the Indian Education program supported through a grant from Title IV, Part A of the Indian Education Act. The Title VII project coordinator was also coordinator of the Title IV project. Through the Title IV project a Native American museum was developed and the Title VII project developed a resource center located in one of the schools. Together they serve as the hub for Indian education in the district. The center was used for field trips by teachers from throughout the district. Title IV personnel staffed the museum, provided programs to students visiting from other schools, and went to other schools to provide classroom instruction. Title VII provided the materials and equipment to the resource center, and Indian students and parents used it for Title VII meetings and special programs on Indian culture. According to project staff, Title VII's particular contribution was in the area of Indian languages. The resource center included several books, tapes and computer programs on the topic, and staff presentations included exposing students to Indian languages, with emphasis on California Indian tribes.

Through the project, effort was also devoted to assembling Indian language materials which would be used as part of the academic tutorial program. For use as part of the tutoring program, and for use by other Indian students as well, the tutoring program had available Language Master cards which provided students with aural/oral exposure to selected words (numerals, colors and some objects) in Lakota, Cherokee and one of the Pomo languages. According to project staff, however, these were rarely used by the students.

In addition, project resources were devoted to the programming of a language game which could be used on the schools' Apple computers. Late in the spring of 1986 the programming was complete. The project was then able to offer students the opportunity to use a modified version of Apple's "square pairs" program (similar to the card game "concentration") to learn to read several words in Lakota and Cherokee.

The language materials will be available for use by students through the Native American bilingual resource center after the termination of the Title VII project.

e. PROJECT RESULTS

Project evaluations were conducted by a third party evaluator and written reports prepared. Limited funds were available for the evaluations and their focus was on both project implementation and student level results. The information contained in the evaluation reports and provided in discussions with parents and school staff indicate the project basically achieved its process objectives and was viewed as having made a positive contribution by school officials. The evaluations included student level material indicating students had made gains in achievement. However, it was not possible to determine the extent to which these gains were due to the Title VII project as opposed to the students' regular school program or other special services they may have received.

Appendix B: GLOSSARY

Part 1. ABBREVIATIONS AND SPECIAL TERMS

Term	Meaning
Academic instruction	Used in discussion of instructional services to refer to math, science, social studies, and ethnic heritage instruction as distinct form instruction in language arts or other subjects.
Adjusted score	A test score corrected for omitted items by adding to the number of items answered correctly a value equal to the quotient obtained when the number of items omitted is divided by the number of options per item.
Algonquian-language students	Students whose native language is an Algonquian language (e.g., Atsina (Gros Ventre), Ojibwa, Passamaquoddy).
Cluster	A set of LEP instructional services received by a student at a given time and defined in terms of the following five characteristics: (1) Percentage of use of the child's native language, in instruction in subjects other than language arts. (2) Whether special instruction in English is provided. (3) Whether simplified English is used more than regular English in instruction in math, science, social studies and ethnic heritage. (4) Whether simplified English is used more than regular English in teaching English language arts. (5) Whether instruction in native language arts is provided. There are 32 clusters.
CPM	Raven Coloured Progressive Matrices (This was the level of the Raven Progressive Matrices Test used in grade 1.)

Term	Meaning
DK	Don't Know (Response to questionnaire item)
English-language students	Students whose native language is English.
EP	English-proficient
ESL	English-as-a-Second Language
Indian	Individuals (singularly or collectively), and their possessions, who are descended from one or another of the indigenous peoples of the Americas, exclusive of Aleuts and Eskimos.
LEP	Limited-English-proficient
LM	Language minority
LM-LEP	Language-minority limited-English-proficient
LM-LEP Study	"National Longitudinal Evaluation of the Effectiveness of Services for Language-Minority Limited-English-Proficient Students"
Major cluster	The six major categories in which the 32 clusters are classified.
Navajo-language students	Students whose native language is Navajo
Other Indian language students	Students whose native language is an Indian language, but not Navajo or an Algonquian or Siouan language.
Raven	Raven Progressive Matrices Test Different levels were used in grades 1 and 3--the CPM level in grade 1 and the SPM level in grade 3.
Rights score	A test score equal to the number of items answered correctly.
SAT	Stanford Achievement Test
S.D.	Standard deviation

Term	Meaning
SEF	Student Evaluation Form This is the form used by teachers to rate students in the study, with respect to their proficiency in various aspects of English, math, and native language.
Services	When this term is used in this report, it refers to instructional services for LEP students.
Service cluster	When this term is used it refers either to the "cluster" as defined above, or to the "major cluster."
SES	Socioeconomic status
Siouan-language students	Students whose native language is a Siouan language (e.g., Assiniboine, Crow, Dakota, Lakota).
SOLOM	Student Oral Language Observation Matrix This is a rating scale, developed under the auspices of the California Department of Education, in which students are rated in five aspects of spoken language: (1) comprehension, (2)fluency, (3) vocabulary, (4) pronunciation, and (5) grammar.
SOPR	Student Oral Proficiency Rating This is a slight modification of the SOLOM, for use in the present study. There are two forms of the SOPR--one for English and one for the student's Indian language. As in the SOLOM, students are rated in five aspects of spoken language: (1) comprehension, (2)fluency, (3) vocabulary, (4) pronunciation, and (5) grammar.
SPM	Raven Standard Progressive Matrices (This was the level of the Raven Progressive Matrices used in grade 3.)

Part 2. STATISTICAL NOTATION

f	Frequency
M	Mean
N	Number of cases
n	Number of items in test
c	Number of choices per multiple-choice item
S.D.	Standard deviation
r_{jk}	Correlation between variables j and k (Unless otherwise specified it is the Pearson product-moment coefficient.)
r_{ii}	Reliability of variable i
$\overline{X}$	Mean of variable X
s	Standard deviation of sample (This is the standard deviation obtained using N as the divisor.)
s_x	Value of s for variable X
σ	Estimate of population standard deviation (This is the standard deviation obtained using N-1, or number of degrees of freedom, as the divisor.)
σ_x	Value of σ for variable X
R	Rights score (i.e., number of test items answered correctly)
O	Number of test items omitted
A	Number of test items attempted
I	Adjusted score (i.e., score adjusted for omitted items)

Appendix C. STUDY DESIGN AND INSTRUMENTATION[1]

C1 1. INTRODUCTION

The design for this study called for a two-year longitudinal evaluation, modeled after the study design of the "National Longitudinal Evaluation of the Effectiveness of Services for Language-Minority Limited-English-Proficient Students." The first part of the study is focused on describing the services offered to Native American limited-English-proficient (LEP) students in elementary schools which receive Title VII funding. The second part of the study looks at the effectiveness of these services in enabling Native American LEP students to function in regular classrooms. Title VII projects were selected as the study focus because they would provide an accessible source of Indian LEP students and because there was interest within the Department of Education in a description of Title VII project services for Indian students. The sampling plan and instrumentation for the study, as described below, reflect this orientation.

The design of the study was developed out of two main conceptual considerations. The first involved an approach to the definition of the types of educational services received by Native American LEP students. In this approach, services for instructional programs are categorized into one of various major sets or clusters of services (we will call them "service clusters"). Essentially, this is a child-centered rather than program-centered orientation to instructional services. This orientation is based on an assumption that children in the same class or instructional program can have quite different instructional experiences because of differences in their native language and English-language proficiency. In this approach information on the instructional experience of each student is obtained and analyzed separately, thus enabling children in the same classroom to be designated as in different service clusters. By utilizing such an approach we avoid the confusion which is likely when popular but non-specific terms such as "bilingual program," "transitional bilingual program," "ESL program" or "mainstream program" are used.

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[1] Abbreviations and other special terms used in this study are defined in the glossary in Appendix B.

The second consideration guiding the design of the study was that of a conceptual model for predicting Native American LEP student outcomes. This model was based on the literatures on academic achievement pertaining to monolingual students, language minority students, and bilingual students. The literature review focused particularly on research on: effective schools, effective teaching, second language acquisition, and the academic achievement of language minority students. Based on the literature review a set of major variables was identified, and a conceptual model defining likely relationships among these variables was described. The study's data collection instruments and preliminary analysis plans were then developed from the predictive model.

The purposes of this chapter are to outline and describe these two key aspects of the study's conceptual base, to provide an overview of the research plan, and then to describe briefly the implementation of the data collection in the field. Provided here is information which we believe to be sufficient for most readers to understand the basis for the chapters of the report.

C2 2. CONCEPTUAL FRAMEWORK

C2.a THE PREDICTIVE MODEL

It was important to begin the study with an understanding of the types of factors that are related to the academic success of students in general, and of LEP students in particular. An important step in this process was a review of the literature on factors associated with academic achievement of elementary-grade-level students, literature which for the most part concerns monolingual English-speaking children. This review was then supplemented by a review of literature focusing on the second language acquisition of young children, and a review of the literature on academic achievement of minority students in particular. The findings of the literature review (Zehler, 1983 a,b,c) were summarized and reported within four areas:

- research on school climate and school effects,
- research on instructional and classroom variables,
- research on effects of programs/services, and
- research on family/community/home variables.

Within each of these areas the findings for monolingual English-speaking children were considered in conjunction with additional factors or emphases that relate to the academic achievement and second language acquisition of LEP students.

A second step in developing the model involved a review of previous models of schooling and achievement. Some of these models concern monolingual English-speaking children (e.g., Carroll, 1963; Cooley-Leinhardt, 1975; Bloom, 1976; Wiley & Harnischfeger, 1974), although their implications are certainly not limited to these children. Other models are focused on LEP students (e.g., Tikunoff, 1982; Cummins, 1979; Morine-Dershimer, 1981). The objective of the review was to provide a comprehensive model reflecting the empirical findings and best judgments of prior researchers as a guide for the design and analytic planning of the study at hand.

Results of these efforts directed toward model-building are presented in Exhibits C.1 and C.2. Exhibit C.1 lists the variables judged to be most important, and Exhibit C.2 suggests a relationship among the various categories of variables. In the model, the relationships all focus on the effect of instruction on the student's academic performance. While many different interrelationships could be studied, the model provides a convenient way of focusing on the major question of the study: How do school services received by Native American LEP students affect their academic performance in the English language?

EXHIBIT C.1. Study variables

Student Language Proficiency and Academic Aptitude

Intellectual reasoning aptitude
Oral proficiency in the native language
Oral proficiency in English
Proficiency in English language arts
Proficiency in mathematics

Other Student and Family Characteristics

Student's age
Student's language group
Student's grade level at beginning of study
Socioeconomic status
Parent's/guardian's education
Extent of English use in the home
Parent's/guardian's interest in education

District and School Characteristics

Percent of LEPs in school
Percent of LEPs in each language group
Percent of LEPs of the same language group as the student
School emphasis on academics and basic skills
Instructional leadership by principal
Extent of English use by students with instructional staff and peers outside of instructional school time

Teacher/Classroom Characteristics

Educational background
Experience teaching LEP elementary school students
Experience teaching Native American students
Philosophy/attitude toward instruction of LM-LEP students
Student/teacher ratios
Grouping practices
Percent of students from same background
Materials used

EXHIBIT C.1. Study variables, continued

Instructional Services Received

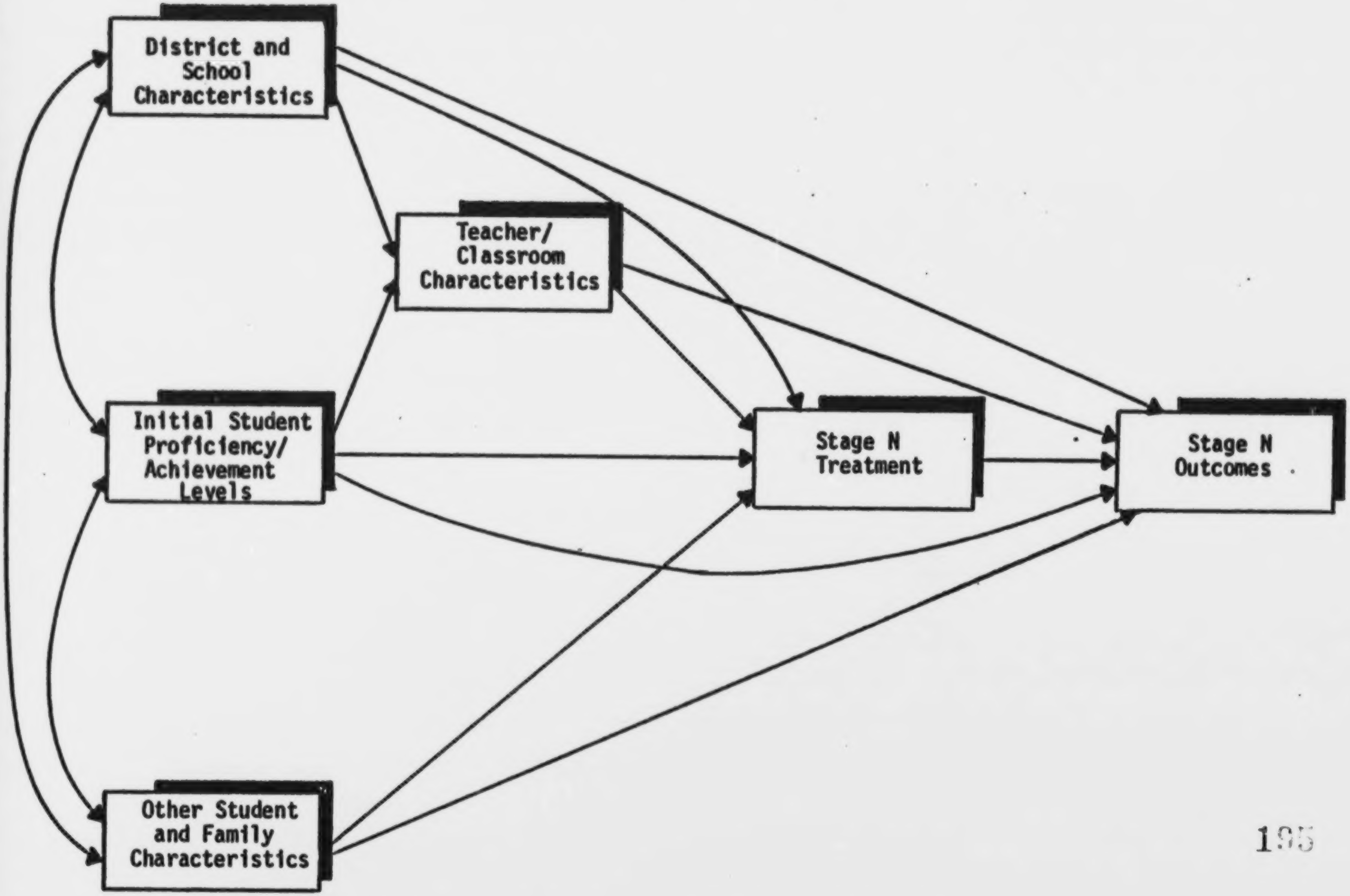
- Total instructional hours in English language arts
- Total instructional hours in math
- Use of the native language for instruction of academic subject areas
- Instruction in native language arts
- Special instruction in English
- Use of simplified English
- Rate of change in use of native language in instruction
- Attendance

Outcomes

- Achievement in English language arts
- Achievement in mathematics
- Teacher ratings of academic performance in English and math
- Teacher ratings of student classroom participation/behavior
- Grade advancement

EXHIBIT C.2

FIRST STAGE MACRO MODEL FOR NATIVE AMERICAN LEP STUDENTS


District and School Characteristics
Teacher/ Classroom Characteristics
Initial Student Proficiency/ Achievement Levels
Stage N Treatment
Stage N Outcomes
Other Student and Family Characteristics

C2.b SERVICE CLUSTERS

For this study a Service Cluster is defined as a set of instructional services provided to a particular student over a particular period of time. Two characteristics of service clusters are especially noteworthy. First, insofar as possible, service clusters are based on what programs actually do, on what services are actually received, and not on program goals or official rhetoric. Second, service clusters are child-centered. The focus is on the set of services individual children receive, without regard to whether the same set of services is provided to most or hardly any other children like them in their classroom or by one or more than one teacher.

The concept of "service clusters" was taken directly from the design of the ongoing "National Longitudinal Evaluation of the Effectiveness of Services for Language-Minority Limited-English-Proficient Students". Based on the data collected for that study, six basic types or clusters of services emerged:

- Type A--the student's native language (Navajo, Crow, etc.) is used almost exclusively;
- Type B--there is substantial use of the students' native language and of English for instruction;
- Type C--there is an emphasis on English, with some instruction provided using the student's native language;
- Type D--essentially all instruction is in English, but with special instruction in English language arts for LEP students;
- Type E--all instruction is in English, with no special instruction in English language arts, but some other form of special services (tutorials, bilingual staff, etc.) is present for LEP students; and
- Type F--all instruction is in English with no special services provided to LEP students.

The service clusters and the five variables comprising them which are used in this study are presented in Table C.1. Services are categorized into six major cluster groups, including 32 specific clusters. In three of the six major clusters (A, B and C) the students' native language is used to

TABLE C.1. Instructional Service Clusters

Cluster Type / Cluster Variable	Extent of Indian Language Use in Non-language-arts Instruction[a]	Special Instruction in English Provided	The English used in instruction is primarily[b] simplified English: in teaching of non-language-arts[a]	in teaching of English	Instruction in Indian Language Arts
A. Instruction Primarily Using Indian Language	High use of the Indian language (Over 87.5%)				
A1		*	*	Yes	Yes
A2		*	*	No	Yes
A3		*	*	Yes	No
A4		*	*	No	No
B. Instruction using Both Indian and English Languages Extensively	Moderate use of the Indian lang. (37.5%-87.5%)				
B1		*	Yes	Yes	Yes
B2		*	Yes	No	Yes
B3		*	No	Yes	Yes
B4		*	No	No	Yes
B5		*	Yes	Yes	No
B6		*	Yes	No	No
B7		*	No	Yes	No
B8		*	No	No	No
C. Emphasis on English, with Some Instruction Using Indian Language	Low use of the Indian language (7.5%-37.499%)				
C1		*	Yes	Yes	Yes
C2		*	Yes	No	Yes
C3		*	No	Yes	Yes
C4		*	No	No	Yes
C5		*	Yes	Yes	No
C6		*	Yes	No	No
C7		*	No	Yes	No
C8		*	No	No	No
D. Instruction Using English, with Special Instruction in English	Minimal or no use of the Indian. language (Less than 7.5%)				
D1		Yes	Yes	Yes	Yes
D2		Yes	Yes	No	Yes
D3		Yes	No	Yes	Yes
D4		Yes	No	No	Yes
D5		Yes	Yes	Yes	No
D6		Yes	Yes	No	No
D7		Yes	No	Yes	No
D8		Yes	No	No	No
E. Instruction Using English, with No Special Instruction in English	Minimal or no use of the Indian language (Less than 7.5%)				
E1		No	Yes in at least one column		Yes
E2		No	No	No	Yes
E3		No	Yes in at least one column		No
F. All Instruction in English, with No Special LEP Service	Minimal or no use of the Indian language (Less than 7.5%)	No	No	No	No

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[a] Non-language-arts instruction includes Math, Science, and Social Studies (including Ethnic Heritage).

[b] Over 50 percent.

*May or may not occur.

a significant extent. The three clusters in which English is used exclusively or almost exclusively (D, E and F) differ with respect to whether the students receive other special services, such as special instruction in English.

C3 3. STUDY DESIGN

C3.a THE SAMPLE

The basic research plan for this study called for two cohorts of students in a national sample of schools served by Title VII-funded projects. The first cohort consists of students who were in grade 1 during the 1985-86 school year. The second cohort consists of students who were in grade 3 that year. Each cohort is further divided into two categories of students. They are:

- Native American limited-English-proficient students, that is, those Native American students officially designated by their schools as LEP during the first year of the study. They may or may not have ever received special language related services. This is the category of principal interest to the study; and,
- Native American English-proficient students. This group includes both students who are currently, or have in the past, participated in special services for Native American students, as well as students who have never participated in such services. The category of English-proficient students is included in the study primarily as a comparison group.

To achieve the purposes of the study, it was determined that it would be necessary for the two cohorts to include at least 1500 students. Based on data regarding student enrollment in Title VII projects in past years, it was estimated that it would be necessary to select approximately 30 Title VII projects to achieve the goal of 1500 students. At the same time, it was also desirable for analytic purposes to have a sample of projects which would be geographically and linguistically representative.

The data necessary for selecting the sample of projects were obtained through a two step process. First, applications and grant award documents for 1985-86 in the files of OBEMLA were reviewed. A total of 58 currently funded Title VII projects serving elementary grade-level Native American students were identified through this review. Of these 58 projects, 53 were located in the lower 48 states and 5 are located in Alaska. Fourteen of the projects were new, being in the first year of the three-year Title VII funding cycle. The other 44 projects were funded under continuation grants, 21 being in their second year of funding and 23 in their third year.

Second, data on the number of students being served were gathered through a telephone and mail survey of these 58 projects. Telephone interviews with the projects' directors or their designees were successfully concluded for 52 of the 53 projects in the 48 contiguous states (one project in California refused to participate), and completed mail questionnaires were received from 4 of the 5 projects in Alaska. Thus, there were data from 56 (96.6%) of the 58 funded projects.

The Native American LEP students served by these 56 projects came from over 25 different Native American language backgrounds. The specific languages which were reported to be spoken by the majority of the Native American LEP students at each project, and the number of projects reporting each language, are shown in Table C.2.

TABLE C.2. Major language groups served by surveyed Title VII projects

1.	Cherokee	(10)
2.	Navajo	(8)
3.	Lakota	(5)
4.	Apache	(4)
5.	Mitchif	(4)
6.	Yup'ik	(3)
7.	Crow	(2)
8.	Dakota	(2)
9.	Ojibwa	(2)
10.	Arikara	(1)
11.	Atsina	(1)
12.	Chitimacha	(1)
13.	Chemehuevi	(1)
14.	Choctaw	(1)
15.	Cree	(1)
16.	Havasupai	(1)
17.	Hualapai	(1)
18.	Keres	(1)
19.	Kickapoo	(1)
20.	Koyukon Athapaskan	(1)
21.	Mandan	(1)
22.	Papago	(1)
23.	Passamaquoddy	(1)
24.	Pomo	(1)
25.	Seneca	(1)

For purposes of sampling, the 56 projects were grouped into six geographic regions, as shown in Table C.3. The number of projects to be selected from each region was determined by the relative number of first and third grade students served by the Title VII projects in that region. Within region, projects were selected in descending order of number of first and third grade students served, in order to ensure that the study's goal of around 1,500 first and third grade students would be met. When a selected project in a region refused to participate, the next largest project in the region was selected as a replacement. The final sample consisted of 25 of the 56 funded Title VII projects.[1] The specific projects included in the study sample are shown in Table C.3. On the basis of preliminary data gathered through the telephone survey it appeared that the two projects in California, although representative of Title VII-funded projects in that state, were sufficiently different from projects elsewhere in the United States to warrant treating them separately from the other 23 projects. Therefore, a case study approach was used in collecting data at these two projects, and no student-level data were collected. The findings from the examination of these two projects are presented in Appendix A. As a result, the sample for the main, on-site data collection consisted of 23 projects.

These 23 projects served a total of 1588 first and third grade Native American students who, as shown in Table C.4, came from 16 different tribal groups, and who, as shown in Table C.5, had 18 different native language backgrounds. For purposes of presenting study findings in this report, students have been grouped into five native language categories. These categories and the native languages included in each are shown in Exhibit C.3.

It is important to note, for purposes of interpreting the findings presented in the report, that although all of the schools in the sample have federally-funded Title VII projects, not all of the students in

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[1] Note that, because of the high cost of data collection in Alaska, the decision was made by the U.S. Department of Education to exclude projects in Alaska from the main data collection for this study.

TABLE C.3. The twenty-five Title VII projects participating in the on-site data collection, by region

Region 1 - Arizona and New Mexico

- Sky City Community School (Acoma Pueblo, New Mexico)
- Santa Rosa Ranch School (Papago Reservation, Arizona)
- White Mountain Apache Tribe (White Mountain Apache Reservation, Arizona)
- Peach Springs School (Hualapai Reservation, Arizona)
- Havasupai School (Havasupai Reservation, Arizona)
- Chinle Unified School District # 24 (Chinle, Arizona)
- Kaibeto Boarding School (Navajo Reservation, Arizona)
- Shonto Boarding School (Navajo Reservation, Arizona)
- Alamo Navajo School Board, Inc. (Alamo Navajo Reservation, New Mexico)
- Central Consolidated School District #22 (Shiprock, New Mexico)

Region 2 - Montana, North Dakota, South Dakota

- Dunseith School District #1 (Dunseith, North Dakota)
- Eight Mile School District #6 (Trenton, North Dakota)
- Loneman School Corporation (Oglala, South Dakota)
- School District 17H (Hardin, Montana)
- Hays/Lodge Pole School District #50 (Hays, Montana)
- Pryor Elementary Public School (Pryor, Montana)
- White Shield School District #85 (Roseglen, North Dakota)

Region 3 - Oklahoma

- Bell Elementary School (Stilwell, Oklahoma)
- Rocky Mountain/Dahlonegah Schools (Tahlequah, Oklahoma)
- Westville Public School District I-11 (Westville, Oklahoma)

Region 4 - California

- Mendicino County Schools (Ukiah, California)
- San Lorenzo County Schools (San Lorenzo, California)

Region 5 - Louisiana, Maine, Michigan, Mississippi, and New York

- Maine Indian Education (Calais, Maine)
- L'Anse Township Schools (L'Anse, Michigan)
- Mississippi Band of Choctaw Indians (Philadelphia, Mississippi)

Region 6 - Alaska

- None

TABLE C.4. Number of students in the sample by tribal group

Tribal group	Number of Students
1. Navajo	665
2. Cherokee	142
3. Crow	115
4. Mitchif (Metis)	110
5. Apache	90
6. Choctaw	73
7. Acoma	64
8. Passamaquoddy	64
9. Hualapai	50
10. Ojibwa (Chippewa)	39
11. Oglala (Lakota)	38
12. Gros Ventre (Atsina)	27
13. Arikara	23
14. Papago (O'odham)	20
15. Havasupai	14
16. Assiniboine	12
TOTAL	1,546

TABLE C.5. Number of students in the sample by native language

Language	Number of Students
1. Navajo	617
2. English	396
3. Crow	114
4. Apache	84
5. Choctaw	74
6. Passamaquoddy	57
7. Hualapai	44
8. Lakota	37
9. Atsina (Gros Ventre)	22
10. Ojibwa (Chippewa)	22
11. Cherokee	18
12. Havasupai	16
13. Papago (O'odham)	16
14. Assiniboine	13
15. Keres	11
16. Arikara	2
17. Comanche	2
18. Dakota	1
TOTAL	1,546

EXHIBIT C.3. Native language categories used for presenting study findings

Language category	Languages included
1. Navajo	Navajo
2. Siouan	Assiniboine, Crow, Dakota, Lakota
3. Algonquian	Atsina, Ojibwa, Passamaquoddy
4. Other Indian Language	Apache, Arikara, Cherokee, Choctaw, Comanche, Havasupai, Hualapai, Keres, Papago
5. English	Non-standard ("tribal", "reservation", "Indian") English and Standard English

the sample are actually served by these projects. This is due to the approach taken to selecting the student sample at each school. Because the preliminary information from the descriptive survey indicated that the Title VII projects in these schools generally serve all of the students at a given grade-level, the rule for selecting the sample was that all first and third grade Native American students were to be included. In nearly all schools in the study, most of the first and third grade students are served by Title VII. However, because the study included all Native American students in first and third grade in each school in the study sample, there are also some students at other schools who were included who do not receive such services. Moreover, in the case of Pryor, Montana, none of the first or third grade students in the study sample were served by the Title VII project because Pryor's project had been implemented only in kindergarten during the 1985-86 school year. Therefore, unless it is specifically stated otherwise, the findings in this report apply generally to Native American students, and not only to those served by Title VII.

C3.b DATA COLLECTION INSTRUMENTS AND INFORMATION SOURCES

At the 23 sites, data were collected regarding school districts, schools, principals, instructional personnel, and students. The focus of the study, however, is students, not schools or districts. Thus data about districts, schools, and school principals are being used as auxiliary data about those students in the corresponding districts and schools; data about teachers are used as auxiliary data applying to students in those teachers' classes.

The need for control variables in such a study is critical. The term "control variable" as used here refers to a variable that helps prevent distortion of the results that might otherwise occur from different instructional programs as a consequence of different levels of ability and potential among the students in the groups being compared, or other factors extraneous to the focus of the study.

Various different kinds of control variables were deemed desirable. These included a baseline measure of academic ability level independent of the child's language, an evaluation of the child's degree of oral proficiency in English and in the Indian language and measures of achievement in English and mathematics. Also included are measures of home context which prior research suggests may confound the effect of the instructional treatment variables of primary interest. The first of these variables (the baseline measure of academic ability) is provided by the Raven Progressive Matrices, the second by the Student Oral Proficiency Rating (SOPR), and the third by scores on the English and mathematics subtests of standardized achievement tests which the students took last spring. The home context measures are provided by a questionnaire developed specifically for this study.

The Raven Progressive Matrices

The status of students in the study as limited-English-proficient necessitated a nonverbal test -- or better yet, a nonlanguage test. (A nonverbal test is one that does not require the respondent to read, write, or speak in taking the test, and presumably does not require verbal skills in determining the answers to the questions. A nonlanguage test is one that meets the requirements for a nonverbal test and also meets one additional requirement -- that it can be administered entirely without the use of words, e.g., in pantomime.)

There are quite a few nonverbal tests available, but hardly any nonlanguage tests. The Raven Progressive Matrices is the best-known and most widely used of the very few such tests extant. It has been used in countries all over the world; furthermore, it has been used with deaf children, speech-impaired children, and limited-English-proficient children. It has also recently been administered to Navajo students in the Bloomfield Public Schools in New Mexico to obtain norms for Native American students. The Raven also has the important advantage that several different levels have been developed, so that there are levels suit[illegible] grade 1 and grade 3.

The Student Oral Proficiency Rating (SOPR)

The Student Oral Proficiency Rating (SOPR) was selected as the instrument to be used for obtaining measures of student oral proficiency in English and in the native language. A primary concern in selecting an oral proficiency instrument was to obtain a measure that would indicate the level of the students' ability to speak and to understand speech within everyday classroom situations, as well as within informal speech situations. A further requirement was the selection of an instrument that utilized as naturalistic a testing situation as possible, since many of the students in the study would be new to schooling overall and, in particular, would not have any test-taking skills. A third concern was to utilize an instrument which could measure both English and native language ability in comparable terms for the large number of different language groups expected to be represented in the study sample.

The limitations of many available oral proficiency tests were considered a significant problem given these requirements. The tasks used in commercially available tests frequently involve only very limited speaking and comprehension skills, or the scoring procedures are limited to a small subset of language skills. The assessment situations required for the tests range from paper-and-pencil tests to individual interview situations focused on specific activities or on guided discussions. Despite this range in the degree to which the tests provide a naturalistic language use situation, they all require a certain "test-wiseness" (and willingness to speak freely with an unfamiliar person) that many limited-English-proficient students do not have, particularly in the lower grades. In addition, the range of languages which can be assessed by any one test is not very large. Generally, they can be used for Spanish and perhaps a few other languages; not one, however, is designed to be used with speakers of Native American languages. The development of comparable tests of the same nature for assessment of oral proficiency in Native American languages would be very complex and costly.

The SOPR was found to fulfill all of the study requirements. The SOPR is a rating instrument that is a slightly modified form of the Student Oral Language Observation Matrix (SOLOM), an instrument used in California to assist in student placements. The SOPR possesses the characteristics that were of concern in our selection of an oral proficiency instrument. It is completely naturalistic in that it provides a measure of student proficiency based on actual comprehension and production within formal and informal classroom discourse situations. The data that form the basis of the teacher ratings of student oral proficiency are the numerous classroom discourse situations in which the teacher and the student have used the language of interest. Thus the data used are drawn from extensive daily interaction with the student and are not limited only to selected topic areas or selected language skills. Since no specific assessment situation is required for the rating, student reticence or test-wiseness is much less a factor in the ratings. For these reasons, the SOPR ratings are expected to be more valid for the study purposes than any scores obtained through the use of the tests available commercially. Also, the general format of the SOPR is such that it can be used for all language groups, provided that there is a qualified teacher available to rate the student in the native language.

One possible concern in the selection of the SOPR, however, was the fact that the student scores depend on ratings by individual teachers. Ratings by teachers are an advantage in that they reflect student oral proficiency in a range of situations over an extended period of time. However, there is a possible disadvantage in that different teachers may base ratings on different standards.

To address this concern, two studies of the SOPR were carried out prior to its use in this study: First, a validity study was conducted in which teacher rating data from California using the SOLOM (the instrument that was very slightly modified to produce the SOPR) were compared with the results of the Bilingual Syntax Measure and Language Assessment Scales for the same set of students. Second, a reliability study was conducted in which the ratings given by two teachers rating the same set of students were (on the basis of mostly nonoverlapping observations) compared. The results of both of these studies (Zehler, 1985) supported the decision to adopt the SOPR as the measure of oral language proficiency in this study.

Standardized Achievement Test Scores

One of the measures of student outcome for the longitudinal study was to have been student scores on the English and mathematics subtests of the Stanford Achievement Test. These subtests were being administered specifically for this study, on top of any standardized tests which the schools or districts require the students to take.

The Parent/Home Questionnaire

A questionnaire was designed to provide measures of the education level, occupation, and interest in school and education of the parents. It was also designed to provide measures of the extent of reading materials in English and other languages in their homes, and the time students spend reading, doing school work, watching television, and listening to the radio. In addition, another interview guide was developed for use with parents and other community members, to investigate the extent of use of English and other languages in the students' homes and in the community, and community attitudes toward the use of the native language in the schools.

C3.c RATIONALE FOR OTHER MEASURES

The other measures used in the study are for the purpose of describing the instructional treatments received by each student, the characteristics of the providers of those treatments, or their educational context. Each of these measures was either developed for the "National Longitudinal Evaluation of the Effectiveness of Services for Language-Minority Limited-English-Proficient Students," and modified as appropriate for this study of Native American students, or developed specifically for this study. The most important of these measures are:

- The Student/Teacher Data Form and the Student Instructional Language Record. These provide the basic information needed to determine each student's service cluster. These forms are completed about each student by each of his or her teachers. They provide the number of hours each student is taught particular academic subjects and in what language(s) he or she is taught them; and specific characteristics of the instructional process and context, as they pertain to each student separately.

- Instructional Staff Questionnaire and Support Staff Questionnaire -- These provide basic information on the personal background and experience of each of the individuals who instruct students in academic subjects. They also provide information about these staff members' general instructional approach and philosophy.

- School Principal Questionnaire — This questionnaire is designed to provide measures of the characteristics of the schools and their principals. The nature and extent of instructional leadership a principal provides may reinforce or detract from the direct effects of particular instructional treatments.

- The school environment forms -- several brief questionnaires and record review forms are used to collect statistical data concerning school enrollment and the socioeconomic status and academic performance of the schools as a whole. Similar instruments have been designed for recording school and district level policy and practice with respect to determining the limited-English-proficiency of Native American students, and with respect to assigning students to special services and exiting them from such services.

As noted previously, this study is student-focused. Therefore, the majority of the instruments described above are directed toward the collection of data on individual study students, or the characteristics of individual staff members who interact with these students. At the same time, however, it was necessary to develop an understanding and description of the specific supplemental instructional services which were available to Native American students in each school. Thus, it was necessary to describe services from the program level. To do this in a manner which revealed the unique characteristics of the services offered at each school, it was essential that the method for recording this information be as qualitative and open-ended as possible. To accomplish this, a special form was used, entitled the Program and Procedures form. This instrument consisted of a list of questions for which the data collectors obtained answers through observation while on site or through informal discussions with school and project administrators and staff members. The questions served as a guide to the data collector, who in turn provided narrative responses to each.

In essence, the study depended upon the data collectors to provide an insightful description of the programs being offered at each site. For this, and other reasons, particular care was taken in selecting the study's lead data collectors. All had extensive experience working with educational programs for Native Americans, and all but one were themselves Native American. Also, each came highly recommended by Native American educators in the regions of the country in which they worked.

In summary, the following types of data have been collected:

- School district, school, and Title VII project demographic and policy information;
- Title VII project staff, principal, teacher, and support staff background characteristics;
- Information from the parents of each student in the study sample regarding use of English and a Native American language in the home, educational aspirations for the student, and student's and parent's attitude toward school;
- Descriptions of the specific types and amount of instructional services provided to each student in the sample, and data on the use of English and Native American languages in providing this instruction;
- Measures of each student's English language proficiency, proficiency in the Native American language, and academic aptitude;
- Each student's scores on the English and mathematics subtests of the Stanford Achievement test; and,
- Ratings from teachers of each student's level of academic performance in English language arts, mathematics, and Native American language arts.

The specific instruments which are being used for data collection during this, the first year of the longitudinal study are shown in Exhibit C.4.

EXHIBIT C.4. Study instruments

Instrument	Completed by
Project Director Questionnaire:	Title VII project directors
School Statistical Summary Form:	Development Associates staff from school records and reviewed by school principals
School Principal Questionnaire:	the principal of each school participating in the study
School Policies and Procedures Form:	Development Associates staff
Instructional Staff Questionnaire:	all teachers of content subjects who work with students in the study sample
Support Staff Questionnaire:	all aides, tutors, volunteers, or resource staff who work with students in the study sample
Student/Teacher Data Form:	the homeroom or main teachers of each of the students in the study sample
Student Instructional Language Record:	all teachers of content subjects who work with students in the study sample
Student Performance Record:	the homeroom or main teachers of each of the students in the study sample
Parent/Home Questionnaire:	one parent or guardian for each student in the study sample
Home/Community Language Use Form:	a sample of parents of study students, and a sample of tribal leaders at each site
Student Background Questionnaire:	Development Associates staff members from student records
Student Oral Proficiency Rating Form (English):	the homeroom or main teacher, or another teacher or aide who is fluent in English

EXHIBIT C.4. Study instruments, continued

Instrument	Completed by
Student Oral Proficiency Rating Form (Native American Language):	the homeroom or main teacher, or another teacher or aide who is fluent in the language on which the child is being rated
Academic Aptitude Measure (Raven Progressive Matrices)	
Coloured Progressive Matrices:	each first grade student in the sample
Standard Progressive Matrices:	each third grade student in the sample
Stanford Achievement Subtests Vocabulary Reading Comprehension Concepts of Number Math Computation Math Applications:	all of the students in the study sample.

4. COMPOSITE VARIABLES

Before the data analysis was begun, a number of composite variables were developed, in most cases by combining on an a priori basis selected questionnaire items dealing with the same topic.[1] Formation of many of the composites[2] began at the time the questionnaires and rating scales were being developed. Using a composite of several questionnaire items dealing with the same general area, rather than using the individual items themselves, has at least two advantages. First, the composite (a weighted or unweighted sum of several items) is likely to be more reliable than any of the individual items; and second, using a composite often makes the findings more comprehensible and easier to interpret.

When a composite is to be developed, it is necessary to decide whether it should be done on an a priori basis or empirically. A wide variety of statistical methodologies exist for developing composites empirically (e.g., multiple regression, multiple discriminant analysis, factor analysis), but in a study such as the present one there are sound arguments against each of them. A priori composites have the advantages of greater comprehensibility, convenience, and credibility, and they have an additional advantage in that they make better use of available data, since they do not require a set-aside subsample. Thus, this approach, rather than a more empirically driven one, was adopted for developing most of the composites presented in this report.

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[1] In a few cases the composite was formed by combining ratings on rating scales or scores on tests, rather than responses to questionnaire items.

[2] These composites are generally described briefly at the point in the report where their use in data analysis is reported. Some are described in somewhat more detail in Appendix D.

C5 5. SCORING OF TESTS

Because the present study is self-contained, incorporating its own control variables, it is not dependent on published norms in order to evaluate results. This gives us the liberty to modify the scoring procedures used by the test publishers in standardizing their tests where we have reason to believe that the modifications may increase the validity and usefulness of the results. We have taken advantage of this circumstance to make some minor, but we think useful, changes. It should be noted that implementing these changes will not impair the results in any way, since in addition to obtaining scores by the modified procedures we have also obtained the conventional set of rights scores. These latter will serve a useful purpose, in that they will make it possible to use publishers' norms.

C5.a KINDS OF SCORES

Both the Stanford Achievement Test (SAT) and the Raven Progressive Matrices are normally given scores equal to the number of items answered correctly (hereafter referred to as "rights scores"); among items not answered correctly, no distinction is made between omitted items and items answered incorrectly. This mode of scoring a multiple-choice test assumes that every student answers every item. When that assumption does not hold, the child who omits items if he or she is uncertain of the answer is penalized inequitably; the child who makes a guess on all such items will probably get about a third of them right purely by chance if they are three-choice items, a fourth if they are four-choice items, etc., while the child who omits deprives himself of this advantage. One way of handling this problem is to "correct" the rights scores for omitted items by adding to the score the estimated number of items the child would have gotten right by chance had he made a guess rather than omitting the items. We choose to call the score obtained this way the "adjusted score."

In our judgment, using adjusted scores is superior to using rights scores. To express this judgment in somewhat more technical terms, adjusted scores tend to give a more valid indication of the student's level of knowledge or ability than do rights scores. If none of the examinees omits any items, it makes no difference which mode of scoring is used, because the rights score and the adjusted score are exactly equal; but to the extent that children differ in their tendency to omit items when they do not know the answer, it can make a big difference. Because using adjusted scores instead of rights scores has no effect (and therefore can have no ill effect) when no items have been omitted, and because it can represent a major improvement — an increase in fairness -- when items have been omitted by some children while other children have answered every item, whether they know the answer or not, we decided to use adjusted scores as the principal scores for both the Stanford Achievement Tests and the Raven. However, as indicated above, we decided to also make a record of the rights scores, to permit comparison with the norms developed by the author or publisher.

As has been implied, rights scores have been used as the basis for norms and other statistics provided by the test publishers or authors. Those who prefer rights scores base their preference on the belief that in scoring tests by hand it is easier to obtain rights scores than adjusted scores, and that on theoretical grounds it does not make much difference which kind of score is used since the correlation between them is typically very high. However, in the present case all scoring is done by computer, and even when the correlation between rights and adjusted scores are very high, there are still likely to be some children who omit large numbers of items, which can substantially distort the results not only for the children affected but for research analyses that include these scores. Thus in subsequent chapters when we report data involving test results, those data, except where indicated to the contrary, will be adjusted score data.

C5.b SETS OF VARIABLES SCORED

There is a slight difference between the list of tests from the Primary 1 SAT battery (used in grade 1) and the Primary 3 battery (used in grade 3). In the latter the following tests are used:

Vocabulary
Reading comprehension
Concept of number
Math computation
Math applications

In the Primary 1 battery, on the other hand, the last two of these five areas are combined in a single test, "Mathematics Computation and Applications." To facilitate comparison of grade 1 and grade 3 results, we have scored the 22 Primary 1 computation and the 23 applications items separately as well as together; and in the Primary 3 battery, we have obtained a combined score for these two tests as well as scoring them separately.

For somewhat similar reasons we have also slightly expanded the set of scores obtained for the Raven. The Raven Standard Progressive Matrices (SPM), which is given in grade 3, consists of five sets of 12 items each -- Sets A, B, C, D, E -- Set A being the easiest and Set E the most difficult. The Coloured Progressive Matrices (CPM). given in grade 1, consists of three sets of 12 items each -- Sets A, AB, and B. Sets A and B are identical to the like-named sets in the SPM except that in the CPM the items are colored. Since the sole function of the coloring is to serve as an attention-grabber for the very small children for whom the CPM is intended, and since the colors provide no clue to the answers, we obtained separate scores for A+B in both CPM and the SPM. The purpose is to facilitate direct comparison between grades 1 and 3 on an identical set of Raven items.

Table C.6 summarizes the scores obtained and other miscellaneous information about the Raven and SAT tests.

C6

6. COMPLETENESS OF THE DATA

Table C.7 presents the response rates for all study instruments. The number of expected forms was determined as follows. There are 23 Title VII projects in the study, and thus 23 project director forms were expected. These 23 projects serve 32 schools, and thus 32 school summary and 32 principal forms were expected. The number of instructional staff members and support staff members working with sample students was unknown until data collection was underway, and thus the number of expected forms with these staff members as respondents was unknown.

TABLE C.6. Miscellaneous information about Raven Progressive Matrices and Stanford Achievement Tests

	Kinds of Score Obtained*	No. of Options Per Item		Number of Items	
Raven Progressive Matrices					
Coloured (CPM)					
Sets A + B	A R I	6		24	
Sets AB	A R I	6		12	
Total (A + AB + B)	R I	-		36	
Standard (SPM)					
Sets A + B	A R I	6		24	
Sets C + D + E	A R I	8		36	
Total (A + B + C + D + E)	R I	-		60	
	Level	Primary 1	Primary 3	Primary 1	Primary 3
Stanford Achievement Test					
English					
Vocabulary	A R I	3	4	38	38
Reading Comprehension	A R I	3	4	40	60
Total	I	-	-	78	98
Math					
Concepts of Number	A R I	4	4	34	34
Computation	A R I	4	5	22	42
Applications	A R I	4	5	23	38
Computation + Applications	R I	-	-	45	80
Total	R I	-	-	79	114
Total (English + Math)	I	-	-	157	212

*Code for "kind of score"
A = No. of items attempted
R = No. of items right
I = adjusted score

TABLE C.7. Response rates for study instruments

Form		Expected*	Received	Percentage Received
1.	Project Director Questionnaire	23	23	100%
2.	School Summary Form	32	32	100%
3.	Principal Questionnaire	32	24	75%
4X.	Instructional Staff Questionnaire	--	147	--
4Y.	Support Staff Questionnaire	--	71	--
7A.	Student/Teacher Data Form	--	94	--
8A.	Instructional Language Record	--	308	--
9.	Student Evaluation Form	1443	1401	97%
10.	Parent Questionnaire	1443	933	67%
10A.	Home/Community Language Use Form	320+	364	100%+
11A.	Student Background Questionnaire	1443	1301	90%
12.	Student Oral Language Proficiency Rating Form - Native Language	1443	1324	92%
13.	Student Oral Language Proficiency Rating Form - English	1443	1443	100%
14A.	Raven Coloured Matrices (Grade 1)	865	805	93%
14B.	Raven Progressive Matrices (Grade 3)	667	638	96%
14C.	Raven Rosters (Grade 1)	865	780	90%
14D.	Raven Rosters (Grade 3)	667	631	95%
17B.	Stanford Achievement Test - English and Math Subtests (Grade 1)	805	794	99%
17D.	Stanford Achievement Test - English and Math Subtests (Grade 3)	631	622	97%

*The number of expected forms was determined as follows. There are 23 Title VII projects in the study, and thus 23 project director forms were expected. These 23 projects serve 32 schools, and thus 32 school summary and 32 principal forms were expected. The number of instructional staff members and support staff members working with sample students was unknown until data collection was underway, and thus the number of expected was unknown. During the telephone/mail survey, the 23 projects included in the on-site data collection reported there to be 865 first grade and 667 third grade students eligible for Title VII services; this, then, was the expected number of Ravens and Raven Rosters. Only students on whom Ravens were obtained were included in the sample for subsequent data collection. Ravens were obtained on a total of 805 first graders and 631 third graders, for a total of 1443 students. These were, therefore, the expected number of forms for other student level instruments. Finally, field staff were asked to complete at least 10 Home/Community Language Use forms per school, for an expected number of at least 320 completed forms. As shown, more than that number were obtained.

During the descriptive survey, the 23 projects included in the longitudinal phase reported there to be 865 first grade and 667 third grade students eligible for Title VII services; this, then, was the expected number of Ravens and Raven Rosters. Only students on whom Ravens were obtained were included in the sample for subsequent data collection. Ravens were obtained on a total of 805 first graders and 631 third graders, for a total of 1443 students. These were, therefore, the expected number of forms for other student-level instruments. Finally, field staff were asked to complete at least 10 Home/Community Language Use forms per school, for an expected number of at least 320 completed forms. As shown, more than that number were obtained.

C7 7. GENERALIZING FROM STUDY RESULTS

In a study such as the present one, it is desirable to be able to generalize the findings beyond the sample included in the study rather than merely saying that the results apply just to the sample and that no inferences beyond can be drawn. How safe it is to generalize and to what broader group generalizations can be applied depend largely on five factors, each of which is discussed below in terms of this study's findings.

The first factor to be considered is the definition of the population to which generalizations are to be drawn. As has already been indicated, the population with which this study is concerned is Native American students in grades 1 and 3, in schools in the lower 48 states with Title VII projects serving Native Americans. Strictly speaking, therefore, it should not be assumed that the findings apply equally to students in schools lacking such funding; we have no findings directly applicable to such schools. (Note also that as indicated above, Alaskan schools have been excluded, at the request of the Department of Education.) However, Title VII projects were selected for study because it was assumed that they would provide a reasonably representative sample of Indian students with limited-English-proficiency. Having completed Phase I of the study, we continue to believe this is a valid assumption. It is important to point out that this is not the same as a representative sample of all Indian students. Indian LEP students tend to live in isolated rural areas, and this not the case for many Indian students.

The second factor to be considered is whether the sample selected was a probability sample of the defined population. As indicated in section 2C.1 above, there were 58 currently funded Title VII projects serving elementary-grade-level Native American students; of these 58, 56 (or 96.6%) cooperated in the preliminary telephone and mail survey. Because this is so close to 100% participation and because there is no reason to suppose that the two nonparticipating projects differ from the participating projects in any significant way other than their failure to participate, we shall treat the participant projects as constituting virtually the entire population of Title VII projects serving elementary-grade-level Native American students.

As for the selection of projects from which additional data (largely student data) would be collected, it was decided, as has already been indicated, that in selecting the desired number of projects in each region, those projects for which the schools had the largest numbers of Native American students would be the ones selected. Operating on this basis, 30 projects were invited to participate; of these, five declined, resulting in a total of 25 participating projects, as was shown in Table C.3. The reasons for nonparticipation, where available, were somewhat neutral (e.g., already participating in other ongoing studies, didn't want to increase burden on staff and students, etc.). Therefore, it seems reasonable to act on the assumption that here too, just as in the case of the telephone-and-mail survey, what we have is virtually a population of participants, rather than just a sample. In this instance, the "population" consists of Title VII projects in schools having comparatively large, in terms of what was typical for their region, numbers of Native American students. This population may, for all practical purposes, be regarded as coinciding, virtually in toto, with the group of schools which would be visited and from which student data would be collected.

One exception, however, must be noted. Preliminary information obtained in the telephone survey indicated that collection of student data from the two California projects would be impractical because each of these projects included such large numbers of schools that there were very few students per school. It was decided, therefore, with the concurrence of the Department of Education and the study's advisory panel, to exclude California from the student data collection phase.[1]

If the population to be represented by the student data is therefore redefined to exclude California (as well as the already excluded Alaska), and to consist only of those schools having the largest numbers of Native American students in the region, the situation with respect to the second of the five factors affecting generalizability (i.e., whether the sample selected was a probability sample of the defined population) is that the student data are better than a sample; they are in fact the population.

The third factor to be considered is how complete was the sampling frame from which the sample was drawn. We have every reason to believe that our the sampling frame (i.e., the initial list of Title VII projects serving Native American students), based on a careful review of files in the Office of Bilingual Education and Minority Languages Affairs (OBEMLA), was accurate.

The fourth factor concerns the extent to which those drawn as sample members agreed to participate. The answer to the question about the extent to which those invited to participate did so has been discussed above. As indicated, 56 of the 58 eligible projects participated in the telephone-and-mail survey, and 25 of the 30 "large" projects agreed to participate in the student-level data collection (although subsequent elimination of the two California projects from this aspect of the study cut the number from 25 down to 23).

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[1] However, site visits were made to the project headquarters and principal schools in each of the two projects selected in California. The findings from these visits are reported in Appendix A.

The fifth factor to be considered is the completeness of the data obtained on the sample members that agreed to participate. This varies somewhat, from variable to variable, but is generally very good. These data were summarized in Table C.7.

In conclusion, we believe that all things considered, it is justifiable to assume the groups of participating schools and students in the study function virtually as populations rather than as samples of Title VII schools serving Indian LEP students, and that these in turn constitute a reasonable (but not a probability) sample of Indian students attending rural schools on or near Indian reservations.

Appendix D: DESCRIPTION OF SELECTED COMPOSITE SCORES AND OTHER VARIABLES

D1 1. SOCIOECONOMIC INDEX

This composite is a weighted sum of two components -- occupational status of parents and parents' education -- which are described in Section 2 and 3 respectively to this appendix. The raw values on occupational status are weighted 3 and the parents' education is weighted 1. This results in an "effective weight" of approximately 5 for status and 4 for education (for LM-LEPs in general). Table D.1 shows the relevant data.

D2 2. OCCUPATIONAL STATUS OF PARENTS

Occupational status of parents is rated on a five-point scale, shown in Table D.2.

D3 3. PARENTS' EDUCATION

There are two composites (A and B) for parents' education, used for slightly different purposes.[1]

Composite A

This is an unweighted average of number of years of schooling for the father and the mother, with a scale value of 14 representing 14 or more years. If data are missing for one parent, the value used is the number of years for the other parent.

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[1] Although the correlation between composites 3A and 3B has not been obtained, it is undoubtedly very high.

TABLE D.1. Descriptive data for socioeconomic status and its component variables

Based on LM-LEP students in Cohorts A and B
N = 4145

	X̄		Range	Raw wt.* (w)	Approx. effective wt.**
Parents' education: Composite A	7.962	3.532	0-14	1	5
Occupational status	2.040	.936	1.5	3	4
Socioeconomic index	14.081	5.292	3.29	-	-

*The raw weight is the weight actually applied in computation.

**The effective weight = kw , where k is a constant. For these data, k was set at 1.42, to give approximately integral values for the effective weight.

NOTE: This table is from Young et al, 1986 (Table B.1). Thus the effective weights are for a varied group of LM-LEP students, rather than specifically for Indians.

TABLE D.2. Occupational status codes

Rating	Professionals	Proprietors, Managers, and Business Persons	Commercial Workers Clerks, Etc.	Manual Workers	Protective and Service Workers	Farm Workers
5	Doctors, lawyers, dentists, engineers, judges, architects, school superintendents, chemists, psychologists, professors	Owners or managers of large businesses (10 or more employees), regional or divisional managers of large financial or industrial enterprises				Owners or managers of large farms (equiv. of 10 or more full-time employees)
4	Teachers, registered nurses, undertakers, newspaper reporters, social workers, chiropractors, artists, authors, accountants, dietitions, airline pilots, musicians.	Owners or managers of moderate-sized businesses (3-9 employees), assistant managers, department managers, etc. of large businesses, store buyers.	Stock brokers, real estate and insurance salespersons, wholesale salespersons		Military, police, and fire senior officers (lieutenants and above)	Owners or managers of medium-sized farms (3-9 employees)
3	Foresters, religious workers, photographers, recreation workers, dance teachers, sports officials, athletes, surveyors, medical technicians, flight attendants, draftsmen	Owners or managers of small businesses, minor officials of businesses, floor managers, contractors	Auto salespersons, bank tellers, executive secretaries	Factory foreman, electricians, plumbers, carpenters, watchmakers, machinists, steel workers, welders, jewelers, masons	Military, police, and fire middle officers (sergents, corporate), auto mechanics	Owners or managers of small farms
2			Typists, file clerks, receptionists, telephone operators, cashiers, library assistants, sales clerks	Apprentices to carpenters, plumbers, and electricians, telephone lineman, bakers, painters	Military, police, and fire persons, practical nurses, bartenders, waitresses, night watchmen, truck drivers, butchers, cooks, barbers, hairdressers, teachers' aides, cab drivers	Tenant farmers, full-time farm workers, ranch hands
1				Sewing machine operators, laborers, assembly line workers maids	Janitors, nurses' aides, messengers, gas station attendants, gardeners,	Migrant farm workers

This composite ("parents' education composite A") is used in Table 3.6. It is the composite used in determining socioeconomic status; it differs slightly from parents' education composite B (see below), which is used in certain tables in Chapter 5.

Composite B

This is a weighted average of the number of years of schooling the parents have had, with a scale value of 14 representing 14 or more years and with the more educated parent having triple weight. If data are missing for one parent the value used is the number of years for the other parent.

This composite is used in Chapter 5.

D4 4. PARENTS' USE OF ENGLISH IN THE HOME

There are two composites (A and B) for parents' use of English in the home.[1]

Composite A

This is a composite of the responses to two questions in the Parent Questionnaire: (1) What languages does the mother speak at home? and (2) What languages does the father speak at home?

Responses to each question were scored as follows:

- 2 points if only English was indicated
- 1 point if English and another language were indicated
- 0 points if a non-English language, but no English, was indicated.

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[1] Although the correlation between composites 4A and 4B has not been obtained, it is undoubtedly very high.

The composite score is obtained by adding the scores for mother's languages and father's languages. This gives a 5-point score scale, running from 0 (no English) to 4 (all English). If data are missing for one parent, the value for the other parent is doubled, so that 0, 1, or 2 becomes 0, 2, or 4.

This composite is used in Chapter 5.

Composite B

This variable, which differs somewhat from Composite A, has a range from 1 to 3, as follows:

1. Both parents use an Indian language exclusively.
2. Mixture of languages.
3. Both parents use English exclusively.

5. STUDENT ORAL PROFICIENCY RATING (SOPR) SCALES

DIRECTIONS: For each of the 5 categories below at the left, mark an "X" across the box that best describes the student's abilities.

	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
A. Comprehension	Cannot understand even simple conversation.	Has great difficulty following what is said. Can comprehend only "social conversation" spoken slowly and with frequent repetitions.	Understands most of what is said at slower-than-normal speed with repetitions.	Understands nearly everything at normal speed, although occasional repetition may be necessary.	Understands everyday conversation and normal classroom discussions without difficulty.
B. Fluency	Speech is so halting and fragmentary as to make conversation virtually impossible.	Usually hesitant; often forced into silence by language limitations.	Speech in everyday communication and classroom discussion is frequently disrupted by the student's search for the correct manner of expression.	Speech in everyday communication and classroom discussion is generally fluent, with occasional lapses while the student searches for the correct manner of expression.	Speech in everyday conversation and in classroom discussions is fluent and effortless, approximating that of a native speaker.
C. Vocabulary	Vocabulary limitations are so extreme as to make conversation virtually impossible.	Misuse of words and very limited vocabulary make comprehension quite difficult.	Frequently uses the wrong words; conversation somewhat limited because of inadequate vocabulary.	Occasionally uses inappropriate terms or must rephrase ideas because of inadequate vocabulary.	Use of vocabulary and idioms approximates that of a native speaker.
D. Pronunciation	Pronunciation problems so severe as to make speech virtually unintelligible.	Very hard to understand because of pronunciation problems. Must frequently repeat in order to be understood.	Pronunciation problems necessitate concentration on the part of the listener and occasionally lead to misunderstanding.	Always intelligible, though one is conscious of a definite accent and occasional inappropriate intonation patterns.	Pronunciation and intonation approximate a native speaker's.
E. Grammar	Errors in grammar and word order so severe as to make speech virtually unintelligible.	Grammar and word order errors make comprehension difficult. Must often rephrase or restrict what is said to basic patterns.	Makes frequent errors of grammar and word order which occasionally obscure meaning.	Occasionally makes grammatical or word order errors which do not obscure meaning.	Grammatical usage and word order approximate a native speaker's.

This form is an adaptation of the Student Oral Language Observation Matrix (SOLOM) developed by the San Jose (California) Unified School District.

The above chart is a reproduction of the five rating scales used in both the English SOPR and the native language SOPR. As indicated by the "levels," students are rated 1-5 on each scale. Total score on each of the two SOPRs is the sum of the ratings for scales A, B, C, D, and E.

D6

6. LANGUAGE USED IN THE COMMUNITY

a. Community use of Indian language - Composite A

Respondents to the Home/Community Language Use questionnaire (selected adults in the community) were asked to indicate what language is typically used in the community in each of the following ten circumstances:

1. Used by elders informally.
2. Used during traditional (Indian) ceremonies.
3. Used by clergy in Christian church.
4. Used during tribal council meetings.
5. Used among children outside of home.
6. Used by adults conducting business.
7. Used by adults to children at home.
8. Used by adults to adults at home.
9. Used by children to adults at home.
10. Used by children to children at home.

Four options were provided for each item. The following table shows the options, and how each was scored.

Option score	Option
1	A. Indian language
-1	B. English
0	C. Other language
0	D. Don't know

Each respondent's questionnaire was scored by totaling the item scores. Thus the possible range was from -10 (English only) to +10 (Indian language only).

The index representing community use of an Indian language is the average of all respondents in the community. Thus the range is again from -10 to +10. Exhibit 3.1 shows the value of the index for each project.

b. Community use of English - Composite C

This composite is a condensed version (reduced to 3 categories), with direction reversed, of the 20-point scale (Composite A) described in paragraph a above. The conversion table and the meaning of each new category are shown below.

Composite A		Composite C	Predominant language
From	To		
2.5	10	1	Indian language
-2.499...	2.499...	2	About equal use of both
-10	-2.5	3	English

Table 3.3 shows which projects are in each category.

D7 7. SERVICE CLUSTERS

The sets of instructional services received by students have been classified into "clusters" of services. There are six "major clusters" (A, B, C, D, E, and F) and 32 clusters altogether when the major clusters are divided into smaller subcategories involving more detailed descriptions of the services.

a. Major Clusters

The six major clusters are defined in terms of the percentage of use of the Indian language in teaching math, science, social studies and ethnic heritage. Details concerning the definitions are provided in Chapter 4, Section 4D. The distribution is in Table 4.8a.

b. Subcategories of Clusters

The subcategories within a major cluster are differentiated on four additional variables:

1. Whether the student receives special instruction in English.

2. Whether the English used in teaching the student math, science, social studies, and ethnic heritage is predominantly (i.e., over 50 percent) simplified English.

3. Whether the English used in teaching the student English is predominantly (i.e., over 50 percent) simplified English.

4. Whether the student receives instruction in Indian language arts.

Details on how these four variables are used are provided in Chapter 4, Table 4.7. The distribution is in Table 4.8b.

Appendix E: TECHNICAL APPENDIX ON RAVEN PROGRESSIVE MATRICES TEST

As discussed in Appendix C, the Raven Progressive Matrices was administered to all students in the study because a measure of academic ability operationally independent of knowledge of the English language was needed.

E1

1. DESCRIPTION OF THE TEST

The LM-LEP status of the students necessitated a nonverbal test—or better yet, a nonlanguage test. (A nonverbal test is one that does not require the respondent to read, write, or speak in taking the test, and presumably does not require verbal skills in determining the answers to the questions. A nonlanguage test is one that meets the requirements for a nonverbal test and also meets one additional requirement--that it can be administered entirely without the use of words, e.g., in pantomime.)

There are quite a few nonverbal tests available, but hardly any nonlanguage tests. The Raven Progressive Matrices is the best-known and most widely used of the very few extant. It has been used in countries all over the world; furthermore it has been used with deaf children, speech-impaired children, and LM-LEP children. The Raven has the important advantage that several different levels have been developed, so that there are levels suitable for grade 1 and for grade 3. In this connection another feature is worth mentioning, which, though not a crucial factor in the selection of the Raven, nevertheless constitutes an added plus. This is the fact that 24 of the 36 items in the level used in grade 1 (the Coloured Progressive Matrices) are identical to the first 24 items in the 60-item level used in grade 3 (the Standard Progressive Matrices). Scoring these 24 items separately (in addition to including them in the totals) enables us to compare grade 1 Raven scores and grade 3 Raven scores more directly than would otherwise be possible.

Another consideration in selection of the Raven was that unlike many nonverbal tests of general academic aptitude it would not have to be administered individually. Administering a test individually to every student in the study would have been out of the question in terms of the project budget. But the Raven can be administered to small groups of students. (For the grade 1 students it was generally administered in groups of five to ten students while in grade 3 the groups were as large as 15 students.)

Some readers may wonder why we refer to the Raven as a measure of general academic aptitude despite its nonverbal character and the well-known fact that academic aptitude has a heavy verbal component. The resolution of this seeming paradox lies in the fact that although the test items in the Raven are nonverbal, the ability they measure has been found for English-proficient children to have a high correlation with intelligence tests (even ones that have a heavy verbal component) and thus with general academic aptitude. Thus it can be assumed to be a good measure of the academic aptitude of LM-LEP students, and to be substantially correlated with verbal aptitude. This makes it ideal as a control variable—a variable that can function as a covariate or as a predictor of expected gain in achievement in determining whether the treatment variables (e.g., service cluster and individual variables that characterize the mode of instruction) have a positive or negative effect in comparison with what might be expected in the absence of special instructional services for LM-LEP students.

Miscellaneous information about the Raven Test is presented in Table E.1.

E2 2. RANGE OF SCORES

As shown in Table E.1, which presents distributions of adjusted scores on the Raven total, the scores have a very wide range, extending from 5 (a chance score) to 36 (a perfect score), in grade 1; the grade 3 range is from 7 (a slightly below chance score) to 50 (out of a possible 60). The fact

TABLE E.1. Miscellaneous information about Raven Progressive Matrices Test (CPM and SPM Levels)

	Kinds of Score Obtained*	No. of Options Per Item	No. of Items
Raven Progressive Matrices			
Coloured (CPM)			
Sets A + B	A R I	6	24
Set AB	A R I	6	12
Total (A + AB + B)	R·I	-	36
Standard (SPM)			
Sets A + B	A R I	6	24
Sets C + D + E	A R I	8	36
Total (A + B + C + D + E)	R I	-	60

*Code for "kind of score"
A = No. of items attempted
R = No. of items right
I = adjusted score

that the range runs from very low to very high, but without a conspicuous bunching of students at either extreme, helps confirm that the Raven CPM is appropriate for our grade 1 sample and that the SPM is appropriate for grade 3.

E3 3. KINDS OF SCORES

As Table E.1 indicates, both "Rights scores" (R) and "adjusted scores" (I) have been obtained. Adjusted scores are scores corrected for chance, by assuming that the quotient obtained by dividing the number of omitted items by the number of options per item is the number of additional items the student would probably have answered correctly if he (she) had guessed. On the basis of this assumption the quotient is added to the number right, to obtain the adjusted score. The reasons for preferring adjusted score to rights score are discussed in Appendix F, Section F.2.

We have slightly expanded the set of scores obtained for the Raven. The Raven Standard Progressive Matrices (SPM), which is given in grade 3, consists of five sets of 12 items each--Sets A, B, C, D, E--Set A being the easiest and Set E the most difficult. The Coloured Progressive Matrices (CPM), given in grade 1, consists of three sets of 12 items each--Sets A, AB, and B. Sets A and B are identical to the like-named sets in the SPM except that in the CPM the items are colored. Since the sole function of the coloring is to serve as an attention-grabber for the very small children for whom the CPM is intended, and since the colors provide no clue to the answers, we obtained separate scores for A+B in both the CPM and the SPM. The purpose is to facilitate direct comparison between grades 1 and 3 on an identical set of Raven items.

E4

4. THE 24-ITEM OVERLAP BETWEEN CPM AND SPM

Every item in a test of academic aptitude should become easier as the child advances from grade to grade. For instance if the same items are given to grade 1 and grade 3, the grade 3 children should tend to score higher. The fact that 24 of the 36 items in the SPM (given to grade 3) are identical to 24 of the 60 items in the CPM (given to grade 1) with the trivial exception that in the CPM the items are in colored ink while in the SPM they are in black and white enables us to confirm that the Raven meets this requirement. Table E.2 shows the Grade 1 and Grade 3 distributions of the 24 overlapping items, for LM-LEP students, along with means and standard deviations. The increase in means from grade 1 to grade 3 equals about one grade 1 standard deviation. This is a substantial difference, quite large enough to be meaningful.

E5

5. INTERCORRELATIONS AMONG PARTS AND TOTAL

The Coloured Progressive Matrices (CPM), given to grade 1, consists of three 12-item scales--Scales A, AB, and B--in ascending order of difficulty. The Standard Progressive Matrices (SPM), given to grade 3, consists of five 12-item scales--Scales A, B, C, D, and E--also in ascending order of difficulty. Scales A and B provide the 24 items that are common to the two levels of the Raven (see section 4 above). Table E.3a shows the intercorrelations among parts and total for LM-LEP students in grade 1; Table E.3b shows the corresponding data for grade 3. The correlation of scales A+B with the rest of the test is .66 for grade 1 and .56 for grade 3.

TABLE E.2. Distribution of Raven adjusted scores on scales A+B (RPM Grade 1 and SPM Grade 3)

Raven	CPM - Grade 1		SPM - Grade 3	
A+B	f	%	f	%
24	2	.3	7	1.1
23	3	.4	19	3.1
22	4	.5	24	3.9
21	12	1.5	47	7.6
20	10	1.3	48	7.8
19	13	1.7	54	8.8
18	20	2.6	57	9.2
17	57	7.3	76	12.3
16	67	8.6	86	14.0
15	90	11.6	67	10.9
14	106	13.6	48	7.8
13	78	10.0	27	4.4
12	68	8.8	20	3.2
11	81	10.4	12	1.9
10	61	7.9	10	1.6
9	36	4.6	3	.5
8	23	3.0	4	.6
7	19	2.5	3	.5
6	10	1.3	1	.2
5	8	1.0	1	.2
4	8	1.0	-	-
3	1	.1	1	.2
2	-	-	1	.2
1	-	-	-	-
0	-	-	-	-
TOTAL	777	100.0	616	100.0
Mean	13.91		16.88	
SD	3.51		3.43	

TABLE E.3a. Intercorrelations among Raven CPM adjusted part scores and total

Grade 1

N = 675

	No. of	CORRELATIONS				
	items	A+B	AB	Total	Mean	S.D.
Sets A+B	24		.664	.937	13.27	3.42
Set AB	12			.884	6.64	2.56
TOTAL	36				19.91	5.46

TABLE E.3b. Intercorrelations among Raven SPM adjusted part scores and total

Grade 3

N = 511

	No. of	CORRELATIONS				
	items	A+B	C+D+E	Total	Mean	S.D.
Sets A+B	24		.565	.819	16.77	3.47
Set AB	36			.936	10.75	5.66
TOTAL	60				27.51	8.15

E6

6. RELIABILITY ESTIMATES

The correlation of scales A+B with the rest of the test can be used as the basis in estimating the Raven's reliability for LM-LEP students. If these correlations are considered to be the correlations between unequal "halves" with unequal standard deviations, Angoff's formula No. 16 (Angoff, 1953) can be applied to provide an estimate of the reliability of the total test. This estimate, at least in the case of the SPM (given to grade 3), should be regarded as a lower-bound estimate of test reliability, in view of the marked difference in difficulty between the parts, which is deliberate and systematic. The two reliability estimates are .80 (for CPM, Grade 1) and .74 (for SPM, Grade 3).

Appendix F.

TECHNICAL APPENDIX ON STANFORD ACHIEVEMENT TEST

F1 1. LEVELS AND TESTS USED

In grade 1 the Primary 1 level of the Stanford Achievement Tests was used; in grade 3 the Primary 3 level was used, as shown in Table F.1. The subtests used in each battery are also shown in that table.

It may be noted from the table that the Primary 1 level of the test (given in grade 1) combines computation and mathematics applications (i.e., word problems) in a single subtest instead of having them in two separate subtests. This created no difficulties since it was possible for us to score the two sets of items separately as well as together. Although the tests we used included none with a title indicating that it is a measure of oral comprehension, the Vocabulary test fulfills this function since each test item is read aloud by the person administering the test.

It should also be noted that the various subtests differ with respect to the degree to which a child who does not understand spoken English or does not read English is handicapped on them. Table F.2 summarizes the relevant data.

F2 SCORING OF TESTS

Because the present study is self-contained, incorporating its own control variables, it is not dependent on published norms in order to evaluate results. This gives us the liberty to modify the scoring procedures used by the test publishers in standardizing their tests where we have reason to believe that the modification may increase the validity and usefulness of the results. We have taken advantage of this circumstance to make some minor, but we think useful, changes. It should be noted that implementing these changes does not impair the results in any way, since in addition to obtaining scores

TABLE F.1. Stanford Achievement Test levels and subtests used

	Grade 1	Grade 3
SAT Level →	Primary 1	Primary 3
Tests		
English		
Vocabulary	X	X
Rdg. Comprehension	X	X
Math		
Concepts of No.	X	X
Computation		X
Applications		X
Computation + Applications	X	

TABLE F.2. Degree to which SAT Tests require ability to comprehend English

SAT Level	SAT items	How administered*	Demands on ability to comprehend	
			Spoken English	Written English
Primary 1	English			
	Vocabulary	A	**	Almost none
	Reading Comprehension	B	Slight	**
	Math			
	Concepts of No.	A	Considerable	Almost none
	Computation	B***	Almost none	None
	Applications	A	Considerable	Almost none
Primary 3	English			
	Vocabulary	A	**	Almost none
	Comprehension	B	Slight	**
	Math			
	Concepts of No.	A	Some	Almost none
	Computation	B***	Almost none	None
	Applications	B	Some	Considerable

*Code

A. Questions are read alout by test administrator.

B. Student reads the questions and answers them.

**This is the kind of comprehension the test is designed to measure.

***Only numbers need be read, not words.

by the modified procedures we have also obtained the conventional set of rights scores. These latter serve a useful purpose, in that they make it possible to use publishers' norms.

F2.a KINDS OF SCORES

Both the Stanford Achievement Tests (SAT) and the Raven Progressive Matrices are normally given scores equal to the number of items answered correctly (hereafter referred to as "rights scores"); among items not answered correctly, no distinction is made between omitted items and items answered incorrectly. This mode of scoring a multiple-choice test assumes that every student answers every item. When that assumption does not hold, the child who omits items if he or she is uncertain of the answer is penalized inequitably; the child who makes a guess on all such items will probably get about a third of them right purely by chance if they are three-choice items, a fourth if they are four-choice items, etc., while the child who omits deprives himself of this advantage. One way of handling this problem is to "correct" the rights scores for omitted items by adding to the score the estimated number of items the child would have gotten right by chance had he made a guess rather than omitting the item. We choose to call the score obtained this way the "adjusted score."

In our judgment using adjusted scores is superior to using rights scores. To express this judgment in somewhat more technical terms, adjusted scores tend to give a more valid indication of the student's level of knowledge or ability than do rights scores. If none of the examinees omits any items, it makes no difference which mode of scoring is used, because the rights score and the adjusted score are exactly equal; but to the extent that children differ in their tendency to omit items when they do not know the answer, it can make a big difference. Because using adjusted scores instead of rights scores has no effect (and therefore can have no ill effect) when no items have been omitted, and because it can represent a major improvement—an increase in fairness—when items have been omitted by some children while other children have answered every item, whether they know the answer or not, we decided to use adjusted scores as the principal scores for both the Stanford Achievement Tests and the Raven. However, as indicated above, we decided to also make a record of the rights scores, to permit comparison with the norms developed by the author or publisher.

As has been implied, rights scores have been used as the basis for norms and other statistics provided by the test publishers or authors. Those who prefer rights scores base their preference on the belief that in scoring tests by hand it is easier to obtain rights scores than adjusted scores, and that on theoretical grounds it does not make much difference which kind of score is used since the correlation between them is typically very high. However, in the present case all scoring is done by computer, and even when the correlation between rights and adjusted scores are very high, there are still likely to be some children who omit large numbers of items, which can substantially distort the results not only for the children affected but for research analyses that include these scores. Thus in subsequent chapters and also in next year's results when we report data involving test scores, those data, except where indicated to the contrary, will be adjusted score data.

F2.b SETS OF VARIABLES SCORED

As was shown in Table F.1, there is a slight difference between the list of tests from the Primary 1 SAT battery that are included in the study and the corresponding list from Primary 3. In the latter the following tests are used:

Vocabulary
Reading comprehension
Concepts of number
Math computation
Math applications

In the Primary 1 battery, on the other hand, the last two of these five areas are combined in a single test, "Mathematics Computation and Applications." To facilitate comparison of results from grade to grade, we have scored the 22 Primary 1 computation items and the 23 applications items separately as well as together; in the Primary 3 battery we have obtained a combined score for these two tests as well as scoring them separately.

Table F.3 summarizes the scores obtained and other miscellaneous information about the SAT tests.

TABLE F.3. Miscellaneous information about Stanford Achievement Tests (Primary 1 and Primary 3 levels)

	Kind of scores obtained	No. of options per item		Number of items	
		Primary 1	Primary 3	Primary 1	Primary 3
Stanford Achievement Test					
English					
Vocabulary	A R I	3	4	38	38
Reading Comprehension	A R I	3	4	40	60
Total	I	-	-	78	98
Math					
Concepts of number	A R I	4	4	34	34
Computation	A R I	4	5	22	42
Applications	A R I	4	5	23	38
Computation + Applications	R I	-	-	45	80
total	R I	-	-	79	114
Total (English + Math)	I	-	-	157	212

*Code for "kind of score"
A = No. of items attempted
R = No. of items right
I = adjusted score

TABLE G.1. Distributions of adjusted scores of Indian students on Stanford Achievement Test

Score	NO. OF CASES Math Total 3*
114	-
113	-
112	-
111	-
110	-
109	1
108	-
107	2
106	-
105	2
104	1
103	-
102	3
101	-
100	4
99	1
98	-
97	3
96	5
95	-
94	3
93	2
92	2
91	4
90	6
89	4
88	3
87	8
86	6
85	1
84	9
83	3
82	8
81	5
80	5

Score	NO. OF CASES			
	Rdg. Comp.	Comput.	Math Total	
	3*	3*	1*	3*
79			-	5
78			-	6
77			-	6
76			-	3
75			4	8
74			4	4
73			3	13
72			5	10
71			9	8
70			11	12
69			12	8
68			9	11
67			5	14
66			14	12
65			11	9
64			14	11
63			9	5
62			14	9
61			13	13
60	-		11	9
59	-		15	8
58	1		15	8
57	2		11	11
56	4		29	11
55	1		21	8
54	4		16	9
53	3		13	12
52	4		21	9
51	3		15	6
50	6		16	7
49	9		17	15
48	9		14	8
47	9		22	10
46	13		22	14
45	11		24	16
44	15		24	9
43	11		14	9
42	17	2	21	13
41	14	3	15	11

Score	NUMBER OF CASES											
	ENGLISH				MATH							
	Vocab.		Rdg. Comp.		Concepts of no.		Comput.		Applic.		Total	
	1*	3*	1*	3*	1*	3*	1*	3*	1*	3*	1*	3*
40			19	14				9			24	9
39			21	11				5			17	9
38	-	1	21	13				15		-	18	10
37	2	1	19	9				7		2	16	7
36	1	-	17	10				13		4	7	4
35	1	-	17	12				7		4	17	14
34	5	5	16	13	1	-		11		4	19	10
33	12	2	18	12	4	-		16		7	14	9
32	8	6	15	18	11	4		11		6	18	6
31	17	5	12	14	17	6		13		8	9	6
30	9	4	26	16	18	7		20		10	16	3
29	11	4	19	13	21	12		21		11	11	9
28	14	11	14	13	21	15		21		10	14	3
27	21	6	27	15	34	14		22		17	10	7
26	16	11	15	18	31	24		20		13	15	5
25	32	10	21	22	29	31		25		14	8	3
24	30	17	16	17	33	19		25		21	8	1
23	26	6	29	17	47	29		21	3	24	4	2
22	32	13	32	10	32	26	19	25	6	21	4	3
21	42	26	40	27	53	31	43	23	19	19	3	-
20	38	25	21	18	47	34	43	29	28	15	6	2
19	48	27	47	27	40	28	48	19	34	22	3	-
18	33	28	41	30	45	26	59	20	36	22	1	1
17	54	35	42	24	39	34	53	33	40	26	4	-
16	58	25	42	15	54	21	57	22	46	32	1	-
15	44	37	53	16	49	31	43	17	58	26	-	-
14	56	38	41	11	37	38	59	18	73	41	1	1
13	50	39	29	13	21	33	46	17	69	32	-	-
12	33	41	14	7	23	15	38	18	62	34	-	-
11	23	31	18	4	18	37	32	18	54	34	-	-
10	18	42	7	-	25	25	36	16	53	28	-	-
9	10	25	2	1	9	25	31	16	47	31	-	-
8	6	19	1	-	6	15	44	7	48	15	-	-
7	-	8	-	-	1	10	33	6	27	19	-	-
6	2	9	-	-	4	2	28	2	24	8	-	-
5	-	4	-	-	-	3	24	1	27	4	-	-
4	-	5	-	-	-	-	14	2	2	5	-	-
3	-	-	-	-	1	-	13	-	6	-	-	-
2	-	-	-	-	-	-	3	-	1	1	-	-
1	-	-	-	-	-	-	-	-	-	-	-	-
0	-	-	-	-	-	-	-	-	-	-	-	-
N	752	566	772	596	771	596	766	596	763	590	761	585
M	19.1	16.2	23.2	29.8	19.9	18.0	13.6	22.5	12.9	17.4	46.6	57.8
σ	6.1	6.4	8.4	11.5	6.0	6.3	5.1	8.6	4.3	7.4	13.7	19.6

*"1" represents grade 1, Primary 1 battery, Form F

"3" represents grade 3, Primary 3 battery, Form F

TABLE G.2a. Population estimates of standard deviations corresponding to the Grade 1 means and percentages in Table 5.17a.

Project #	Rdg (Reg. Eng.)	Spec. Eng. except Oral	English			Ind. lang.	Math	Math taught in Eng.	Ind. lang. used in MSS	Spec. Instr. in Eng.	Use of Simplified Eng. in teaching		Instr. in Ind. lang. arts	Major Cluster
			Reg.	Spec.	Total						MSS*	Eng.		
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	1.52	1.68	2.44	1.18	3.56	2.43	1.86	1.78	39	0	0	26	49	.25
3	1.59	.87	2.63	1.48	3.32	2.07	.92	.85	5	0	16	19	0	.20
4	1.92	0	3.69	0	3.69	.93	.78	.78	5	0	0	7	30	.60
5	3.11	.33	5.98	1.58	5.07	.50	.74	.72	11	37	35	31	0	.41
6	3.32	0	6.61	.93	5.81	0	.39	.76	31	46	46	44	0	1.29
7	-	-	-	-	-	-	-	.12	-	-	-	-	-	-
8	4.20	2.32	4.27	2.64	2.88	2.49	1.74	2.05	18	0	50	50	50	.80
9	2.50	.51	3.49	.67	3.69	.78	.58	.50	12	39	14	31	0	.95
10	3.12	0	3.84	.54	4.09	1.12	.97	1.23	19	45	0	0	50	1.19
11a	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11b	0	0	0	0	0	0	0	.00	0	0	0	0	0	0
12	0	.93	.69	2.24	1.56	0	.37	.95	23	46	46	44	0	1.39
13	4.33	.44	3.80	.15	3.90	0	.60	.60	0	0	22	41	0	0
14	0	0	0	0	0	0	0	.00	0	0	0	0	0	0
15	0	0	0	0	0	0	0	.00	0	0	0	0	0	0
16	1.25	0	1.25	0	1.25	0	1.15	1.15	2	0	0	9	0	0
17	1.71	0	1.71	0	1.71	0	0	.00	0	0	0	9	0	0
18	2.43	2.91	3.37	5.81	7.08	0	.54	.54	0	34	45	15	0	.34
19	1.09	.61	.82	.61	.81	0	.48	.48	0	24	0	0	0	.24
20	3.14	.63	4.91	1.36	4.54	.80	1.57	1.57	0	46	5	5	49	.46
21	1.50	.26	2.24	.52	2.18	.26	1.41	1.41	0	52	0	4	52	.52
22	1.84	2.84	2.99	5.65	8.35	0	1.29	1.29	0	0	49	22	0	0
23	.46	.35	.92	.11	.91	0	.46	.46	2	0	0	3	0	0
For entire population	3.96	1.95	5.36	3.97	6.13	2.17	1.51	1.73	24	45	43	38	50	.96

TABLE G.2a. (Continued)

SAT Primary 1 (Form F) - SD								SD of Raven (CPM) Total	SD of SOPR Total		SD of Parents' Ed. (B)	SD of Parents' use of Eng. in home (A)	Socio-econ. Status	Project #
English			Math				Total (Eng + Math)							
Vocab.	Rdg.	Total	Concepts of no.	Comput.	Applic.	Total			Eng.	Ind.				
3.15	2.49	3.40	4.45	5.03	2.70	11.01	11.64	4.31	4.91	0	-	-	-	1
4.51	3.32	9.84	5.40	4.28	3.97	12.04	20.27	5.57	5.14	5.99	4.04	.99	5.74	2
3.77	8.08	10.54	3.62	3.97	2.78	8.95	18.30	4.85	2.33	4.67	1.03	.88	2.93	3
5.09	.70	14.28	5.74	6.06	3.72	14.68	28.03	6.33	1.75	5.22	2.32	0	5.30	4
4.26	6.60	9.07	4.47	4.83	3.47	11.09	18.21	5.30	5.14	5.75	4.06	.95	4.94	5
3.79	6.63	8.78	5.72	5.37	3.49	12.48	19.03	5.73	4.65	7.16	3.66	1.50	5.13	6
3.42	3.68	5.42	3.47	4.25	2.94	8.55	10.80	5.37	3.57	3.42	4.26	.96	4.61	7
4.03	5.78	8.00	6.19	4.83	4.22	13.85	20.31	5.42	3.54	5.00	4.18	.77	5.27	8
5.67	8.43	12.68	4.64	2.66	3.13	9.05	19.51	4.10	2.40	3.55	4.04	.97	4.53	9
5.67	9.05	13.01	5.16	5.83	3.32	12.58	23.02	5.57	4.97	8.60	-	-	-	10
5.64	9.01	13.62	3.06	3.13	2.57	7.60	20.22	5.57	2.34	6.26	1.32	0	2.29	11a
4.04	6.80	10.07	4.88	3.13	.10	9.66	18.46	6.37	2.14	1.46	1.15	.89	5.11	11b
5.53	7.40	12.15	4.50	5.71	3.72	12.98	22.91	6.69	4.59	6.67	-	-	-	12
6.31	7.59	12.92	5.71	3.74	3.54	10.60	22.41	5.19	3.86	0	3.07	.38	4.05	13
4.41	7.96	10.55	4.32	3.50	2.39	8.18	16.86	6.35	3.01	0	1.05	0	3.21	14
3.96	5.15	7.27	3.56	1.77	1.49	4.00	7.32	5.15	.71	-	4.26	1.46	9.11	15
5.42	8.31	12.22	4.22	4.89	3.16	9.06	19.62	6.24	2.57	4.82	2.74	1.01	4.13	16
5.70	7.93	12.40	6.23	6.27	4.33	15.77	28.04	3.58	5.73	.34	3.16	1.49	5.82	17
6.13	8.69	12.81	6.42	4.27	4.14	13.24	23.50	4.71	3.21	5.60	1.77	1.30	2.88	18
5.92	6.95	11.95	5.70	3.57	4.16	12.16	22.99	5.84	.18	-	1.49	.52	3.71	19
6.00	6.71	10.50	5.59	5.78	4.30	13.46	22.25	5.29	1.27	6.03	1.57	.74	4.22	20
3.78	7.23	10.57	4.66	3.16	4.16	9.57	16.90	3.62	3.61	3.02	1.36	.35	3.78	21
5.02	7.98	11.74	4.97	5.12	4.82	12.98	23.60	5.46	3.80	4.97	3.48	.93	4.36	22
-	3.77	-	2.56	3.20	1.39	3.89	-	7.56	1.93	6.91	5.18	1.51	1.73	23
6.09	8.39	13.07	5.98	5.09	4.33	13.65	24.83	5.59	4.96	7.27	3.44	1.34	4.60	

TABLE G.2b. Population estimates of Standard deviations corresponding to the Grade 3 means and percentages in Table 5.17b

Project #	Rdg (Reg. Eng.)	Spec. Eng. except Oral	English			Ind. lang.	Math	Math taught in Eng.	Ind. lang. used in MSS	Spec. Instr. in Eng.	Use of Simplified Eng. in teaching		Instr. in Ind. lang. arts	Major Cluster
			Reg.	Spec.	Total						MSS*	Eng.		
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1.00	0	2.10	.86	1.82	0	1.90	.94	8	50	30	9	0	.14
3	.66	0	.62	.43	.76	0	.86	.86	1	0	2	26	0	0
4	.74	0	1.58	0	1.58	0	.92	.92	5	0	5	0	0	.33
5	1.84	.57	1.60	1.08	.94	1.01	.57	.57	3	49	36	10	46	0
6	3.18	0	4.10	1.59	2.95	.24	2.70	3.16	27	44	38	40	48	1.35
7	1.10	.96	1.10		.96	2.06	0	1.34	19	0	37	27	0	.84
8	1.47	2.20	2.38	2.13	1.07	2.23	.55	.86	12	0	44	44	49	.50
9	.04	.56	.86	.71	1.33	.11	1.12	.99	8	36	14	42	27	.66
10	.82	0	1.05	.35	1.16	0	1.17	1.36	15	35	0	0	0	1.00
11a	0	0	0	0	0	0	0	.00	0	0	0	0	0	0
11b	0	0	0	0	0	0	0	.00	0	0	0	0	0	0
12	.17	0	2.44	1.06	2.66	0	.54	.71	6	42	9	19	0	.69
13	2.50	2.51	2.42	5.02	6.24	0	1.46	1.46	0	0	0	1	0	0
14	0	0	0	0	0	0	0	.00	0	0	0	0	0	0
15	0	0	0	0	0	0	0	.00	0	0	0	0	0	0
16	1.27	0	1.37	0	1.37	0	1.50	1.09	0	0	0	12	0	0
17	0	0	0	0	0	0	0	.00	0	0	0	0	0	0
18	3.61	2.93	5.37	4.97	9.51	0	1.24	1.24	0	50	2	19	0	.50
19	1.77	1.08	1.64	1.08	1.99	.49	.89	.89	0	43	9	0	49	.43
20	3.55	.74	4.52	1.06	5.02	8.60	1.60	1.60	0	37	8	5	50	.37
21	2.68	.25	6.69	.51	6.26	.25	1.86	1.86	0	51	0	11	50	.51
22	3.51	2.30	7.00	3.7	8.40	2.86	1.53	1.58	20	0	31	16	51	.96
23	.53	.90	1.06	1.80	.73	0	.37	.03	2	0	0	10	0	0
For entire population	2.70	2.26	3.96	3.99	5.86	3.11	1.62	1.65	18	49	38	29	50	1.05

TABLE G.2b..(Continued)

SAT Primary 3 (Form F) - SD								SD of Raven (SPM) Total	SD of SOPR Total		SD of Parents' Ed. (B)	SD of Parents' use of Eng. in home (A)	Socio-econ. Status	Project #
English			Math				Total (Eng + Math)							
Vocab.	Rdg.	Total	Concepts of no.	Comput.	Applic.	Total			Eng.	Ind.				
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
4.13	8.53	11.75	5.15	9.00	6.55	17.58	27.09	7.71	5.79	6.62	4.75	1.26	2.25	2
4.01	9.85	12.66	5.20	5.28	4.91	12.10	19.60	7.71	2.80	5.89	1.90	.24	2.52	3
5.59	12.71	16.41	5.25	4.72	8.26	16.92	30.74	6.25	2.87	5.90	3.51	.84	4.62	4
3.84	9.81	11.95	5.54	7.73	6.01	16.52	25.86	6.99	3.25	4.81	5.22	1.15	5.17	5
3.59	7.31	8.99	5.83	7.04	3.58	10.38	15.70	7.29	3.17	6.90	2.61	1.79	5.50	6
2.54	5.31	5.70	4.41	5.99	4.01	12.64	15.14	5.32	6.28	3.32	3.80	.70	5.13	7
6.14	9.61	11.60	6.90	7.61	5.83	16.36	24.73	7.95	3.82	6.09	3.15	.77	5.60	8
6.82	13.29	17.85	6.06	8.51	7.37	19.45	34.10	8.17	4.09	7.12	3.40	.86	4.28	9
6.25	9.41	15.41	4.27	7.23	5.28	13.09	29.40	9.40	4.04	5.69	-	-	-	10
4.09	9.87	12.61	4.54	5.58	7.94	15.69	24.98	6.80	1.29	5.02	1.90	0	4.54	11a
4.18	12.36	16.17	8.22	12.89	10.73	30.91	44.99	5.81	.52	.84	.72	0	2.66	11b
5.12	9.77	13.23	5.20	4.89	5.67	11.97	20.75	8.20	3.28	8.12	-	-	-	12
6.89	11.95	17.26	5.12	7.74	7.09	16.75	31.34	7.83	2.85	0	3.31	0	2.75	13
6.15	10.20	14.48	7.27	7.41	8.57	19.53	33.65	9.03	1.40	0	1.72	0	4.10	14
5.42	12.29	16.21	6.74	7.69	9.63	21.63	35.31	9.39	2.35	-	1.55	.84	3.43	15
5.32	12.12	16.25	4.71	7.33	6.91	17.70	30.73	8.39	.52	7.10	3.29	.65	4.79	16
3.70	5.89	9.14	5.68	7.34	7.06	18.77	26.22	7.11	3.19	6.03	2.38	.74	3.51	17
4.83	12.75	16.04	6.65	7.51	9.05	22.02	36.07	9.91	3.68	5.34	3.11	.90	5.76	18
7.49	12.56	18.63	6.00	9.43	9.12	23.52	39.12	8.84	.88	-	1.20	.34	4.38	19
3.86	10.92	13.93	5.97	7.03	6.80	16.80	28.19	7.73	3.49	5.86	2.69	.81	5.11	20
2.44	10.03	10.74	5.54	7.22	7.18	14.34	17.85	6.89	4.32	4.62	2.01	.50	3.29	21
3.86	11.21	13.93	5.99	8.72	7.99	20.55	32.64	8.73	4.19	3.98	3.55	1.05	5.35	22
2.70	4.69	4.10	3.58	5.89	2.86	11.95	11.30	4.32	4.75	4.72	.89	1.67	2.65	23
6.36	11.49	16.23	6.29	8.58	7.39	19.47	33.08	8.13	4.19	7.34	3.50	1.31	4.69	

TABLE G.3a. Numbers of cases on which the Grade 1 means and percentages in Table 3.17a are based

Project #	No. of students whose native language is		N U M B E R													
	Ind. lang.	English	Rdg (Reg. Eng.)	Spec. Eng. except Oral	English Reg.	English Spec.	English Total	Ind. lang.	Math	Math taught in Eng.	Ind. lang used in MSS	Spec Instr. in Eng.	Use of Simplified Eng. in teaching MSS*	Use of Simplified Eng. in teaching Eng	Instr. in Ind. lang. arts	Major Cluster
1	23	-	22	22	22	22	22	22	22	22	22	22	22	22	22	22
2	69	-	68	68	68	68	68	68	68	68	68	68	48	68	68	48
3	20	4	24	24	24	24	24	24	24	24	24	24	24	24	24	24
4	9	1	11	11	11	11	11	11	11	11	11	11	11	11	11	11
5	175	-	105	105	105	105	105	105	105	105	105	105	105	105	105	105
6	51	3	49	49	49	49	49	49	49	49	49	49	49	49	49	49
7	48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	69	23	57	57	57	57	57	57	57	57	57	57	57	57	57	57
9	7	27	34	34	34	34	34	34	34	34	34	34	34	34	34	34
10	30	1	30	30	30	30	30	30	30	30	30	30	30	30	30	30
11a	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11b	6	-	6	6	6	6	6	6	6	6	6	6	6	6	6	6
12	30	-	21	21	21	21	21	21	21	21	21	21	21	21	21	21
13	1	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
14	-	13	12	12	12	12	12	12	12	12	12	12	12	12	12	12
15	1	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
16	25	-	25	25	25	25	25	25	25	25	25	25	25	25	25	25
17	-	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
18	1	22	23	23	23	23	23	23	23	23	23	23	23	23	23	23
19	-	35	33	33	33	33	33	33	33	33	33	33	33	33	33	33
20	34	4	34	34	34	34	34	34	34	34	34	34	34	34	34	34
21	8	8	14	15	14	15	14	15	15	15	15	15	15	15	15	15
22	40	-	39	39	39	39	39	39	39	39	39	39	39	39	39	39
23	8	-	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Total for entire population			684	685	684	685	684	685	685	685	685	685	665	685	685	665

TABLE G.3a. (Continued)

OF STUDENTS

SAT Primary 1 (Form F)								Raven (CPM) Total	SOPR Total		Parents' Ed. (B)	Parents' use of Eng. in home (A)	Socio-econ. Status	Project #
English			Math				Total (Eng + Math)							
Vocab.	Rdg.	Total	Concepts of no.	Comput.	Applic.	Total			Eng.	Ind.				
18	18	18	18	18	18	18	18	21	22	22	-	-	-	1
63	63	63	63	63	63	63	63	66	66	61	8	8	5	2
23	23	23	23	23	23	23	23	24	24	24	24	24	23	3
11	11	11	10	10	10	10	10	11	11	11	3	3	2	4
162	163	162	162	160	160	159	159	138	166	166	70	69	52	5
50	52	50	52	51	49	49	47	47	49	49	16	17	11	6
41	41	41	41	41	41	41	41	36	44	44	15	16	4	7
57	57	57	57	57	57	57	57	79	57	55	43	43	28	8
32	33	32	34	34	34	34	32	34	34	34	30	30	22	9
31	31	31	30	31	31	30	30	31	31	31	-	-	-	10
9	9	9	9	9	9	9	9	8	7	9	8	8	4	11a
7	7	7	7	7	7	7	7	6	6	7	5	5	3	11b
17	21	17	21	21	20	20	16	25	20	9	-	-	-	12
40	41	40	40	40	40	40	40	42	42	43	27	27	21	13
12	11	11	12	12	12	12	11	12	13	13	10	9	8	14
8	9	8	9	8	8	8	8	10	9	-	8	8	5	15
24	24	24	24	24	24	24	24	25	25	25	15	15	8	16
14	16	14	16	16	16	16	14	16	16	16	11	10	7	17
23	23	23	23	23	23	23	23	19	22	18	12	13	11	18
32	32	32	32	32	32	32	32	34	31	-	31	31	26	19
28	29	28	29	28	28	29	28	33	34	33	32	34	19	20
8	8	8	8	8	8	8	8	15	16	16	15	15	10	21
38	38	38	38	38	38	38	38	37	39	38	31	30	22	22
-	7	-	8	8	8	8	-	8	8	8	7	7	3	23
748	767	747	766	762	759	757	738	777	792	732	421	422	294	

*Numbers of cases less than 4 are shown in this table, but the corresponding means are not shown in Tables and

TABLE G.3b. Numbers of cases on which the Grade 3 means and percentages in Table 5.17b. are based

Project #	No. of students whose native language is		N U M B E R													
	Ind. lang.	English	Rdg (Reg. Eng.)	Spec. Eng. except Oral	English Reg.	English Spec.	English Total	Ind. lang.	Math	Math taught in Eng.	Ind. lang. used in MSS	Spec Instr. in Eng.	Use of Simplified Eng. in teaching MSS*	Use of Simplified Eng. in teaching Eng	Instr. in Ind. lang. arts	Major Cluster
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	55	-	53	53	53	53	53	53	53	53	53	53	53	53	55	53
3	25	1	26	26	26	26	26	26	26	26	26	26	26	26	26	26
4	7	2	9	9	9	9	9	9	9	9	9	9	9	9	9	9
5	101	-	70	70	70	70	70	70	70	70	70	70	70	70	70	70
6	33	3	31	31	31	31	31	31	31	31	31	31	31	31	31	31
7	19	-	19	19	19	19	19	19	19	19	19	19	19	19	19	19
8	59	24	60	60	60	60	60	60	60	60	60	60	60	60	60	60
9	4	26	27	27	27	27	27	27	27	27	27	27	27	27	27	27
10	25	1	22	22	22	22	22	22	22	22	22	22	22	22	22	22
11a	18	1	16	16	16	16	16	16	16	16	16	16	16	16	16	16
11b	6	-	6	6	6	6	6	6	6	6	6	6	6	6	6	6
12	28	-	27	27	27	27	27	27	27	27	27	27	27	27	27	27
13	1	36	35	35	35	35	35	35	35	35	35	35	35	35	35	35
14	-	15	9	9	9	9	9	9	9	9	9	9	9	9	9	9
15	1	12	13	13	13	13	13	13	13	13	13	13	13	13	13	13
16	12	1	13	13	13	13	13	13	13	13	13	13	13	13	13	13
17	3	10	11	11	11	11	11	11	11	11	11	11	11	11	11	11
18	14	6	20	20	20	20	20	20	20	20	20	20	20	20	20	20
19	-	35	34	34	34	34	34	34	34	34	34	34	34	34	34	34
20	26	-	26	26	26	26	26	26	26	26	26	26	26	26	26	26
21	11	12	21	23	21	23	21	23	23	23	23	23	23	23	23	23
22	33	-	31	31	31	31	31	31	31	32	31	31	31	31	31	31
23	6	-	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Total for entire population			585	587	585	587	585	587	587	587	587	587	587	587	587	587

TABLE G.3b. (Continued)

OF STUDENTS

SAT Primary 3 (Form F)								Raven (SPM) Total	SOPR Total		Parents' Ed. (B)	Parents' use of Eng. in home (A)	Socio-econ. Status	Project #
English			Math				Total (Eng + Math)							
Vocab.	Rdg.	Total	Concepts of no.	Comput.	Applic.	Total			Eng.	Ind.				
-	-	-	-	-	-	-	-		-	-	-	-	-	1
47	47	47	46	47	47	46	46	49	52	53	11	11	7	2
25	25	25	25	25	25	25	25	25	26	26	26	26	23	3
9	9	9	9	9	9	9	9	9	9	9	6	6	3	4
94	94	94	94	93	92	91	91	95	97	97	47	48	33	5
30	29	29	30	30	25	25	24	29	32	30	5	5	5	6
19	19	19	19	19	19	19	19	14	19	19	14	15	6	7
39	61	39	60	61	60	60	38	73	63	63	51	50	28	8
29	29	29	29	29	29	29	29	30	30	30	26	26	18	9
11	23	11	23	23	22	22	11	22	23	23	-	-	-	10
17	17	17	17	17	17	17	17	17	17	19	19	19	10	11a
6	6	6	6	6	6	6	6	5	6	6	5	5	4	11b
27	24	24	26	27	27	26	24	27	9	8	-	-	-	12
37	37	37	37	37	37	37	37	33	37	21	23	24	12	13
14	14	14	13	13	13	13	13	15	15	15	12	10	11	14
15	12	12	12	12	12	12	12	12	12	-	10	10	8	15
13	13	13	13	13	13	13	13	13	13	13	12	12	5	16
12	12	12	12	12	12	12	12	10	12	11	9	8	6	17
20	20	20	20	20	20	20	20	20	20	14	11	11	10	18
34	34	34	34	32	34	32	32	35	22	-	31	31	30	19
24	24	24	24	24	24	24	24	24	26	25	21	23	14	20
9	9	9	9	9	9	9	9	23	23	22	22	22	10	21
31	31	31	31	31	31	31	31	31	31	32	27	28	19	22
5	5	5	5	5	5	5	5	5	6	6	5	5	4	23
564	594	560	594	594	588	583	547	616	600	542	393	395	266	

*Numbers of cases less than 4 are shown in this table, but the corresponding means are not shown in Tables and

TABLE G.4a. Intercorrelations among project means and percentages on selected variables: Grade 1

	CORRELATION													
Variable	A. Mean hrs./wk.							B.Math: Hrs. in Eng.	C. Langs.used or taught (%)					D Major Cluster
	1	2	3	4	5	6	7		1	2	3	4	5*	
A. Mean hrs./wk.														
1. Reg. Eng:Rdg		.10	.93	.01	.72	.20	.66	.64	-.55	-.16	-.23	-.00	-.08	.26
2. Spec.Eng (except oral)			-.06	.94	.65	.38	-.07	-.14	.17	.61	.49	-.19	-.05	-.22
3. Reg Eng Total				-.11	.68	-.14	.65	.61	-.49	-.22	-.26	.10	.02	.22
4. Spec. Eng Total					.65	.46	-.14	-.23	.27	.68	.48	.29	.04	-.33
5. Eng Total (Reg & Spec)						.23	.39	.30	-.18	.33	.15	.29	.05	-.08
6. Indian language							-.17	-.33	.57	.28	-.06	.16	.67	-.55
7. Math								.95	-.71	-.36	-.48	-.20	.04	.51
B. Math:Hrs./wk. in Eng.									-.85	-.41	-.58	-.28	-.08	.63
C. Languages used or taught														
1. MSS: % in Indian lang.										.34	.49	.38	.42	-.83
2. % spec. receiving instruction in Eng.*											.49	.27	.05	-.49
3. MSS: % in simplified Eng.												.47	-.17	-.48
4. English: % in simplified Eng.													.03	-.52
5. % taught Indian lang.*														-.61
D. Major Cluster														
E. Stanford Ach. Test (Prim 1, form F)														
1. English														
a. Vocab														
b. Reading Comp														
c. Total														
2. Math														
a. Concepts of no.														
b. Comput.														
c. Applics.														
d. Total														
3. Eng. + Math														
a. Total														
F. Raven Total (CPM)														
G. SOPR														
1. Indian language SOPR														
2. Eng SOPR														
H. Home and family														
1. Parents' Ed - B														
2. Parents' use of Eng. in home - A														
3. Socioeconomic Status														
I. Community Use of Ind. lang.														

TABLE G.4a. (Continued)

COEFFICIENTS																	
E. Stanford Ach. Test (Prim. 1 form F)								F.	G.SOPR		H. Home & Family			I Comm. Use of Ind.lang.			
1.English			2. Math				3. Eng + Math										
a	b	c	a	b	c	d		Raven	1	2	1	2	3		Mean	σ	N
.20	.30	.26	.08	-.19	.10	.00	.13	.03	.15	-.39	.15	.02	-.06	-.27	6.32	3.13	22
-.42	-.33	-.33	-.52	-.28	-.52	-.48	-.38	-.45	-.44	.16	-.34	-.41	-.61	.35	1.29	1.63	22
.15	.27	.22	.06	-.12	.09	.01	.11	.03	.16	-.48	.18	.04	.06	-.30	10.05	3.88	22
-.55	-.42	-.47	-.65	-.33	-.61	-.58	-.53	-.47	-.48	.19	-.32	-.44	-.54	.46	3.26	3.72	22
-.28	-.10	-.17	-.43	-.34	-.37	-.42	-.30	-.33	-.24	-.22	-.12	-.31	-.38	.10	13.31	5.07	22
-.46	-.57	-.49	-.59	-.49	-.59	-.60	-.49	-.67	-.33	.32	-.22	-.33	-.05	.49	1.73	2.52	22
.57	.50	.54	.36	.17	.43	.34	.44	.27	.61	-.42	.52	.33	.21	-.49	4.40	1.07	22
.66	.60	.64	.47	.27	.55	.46	.55	.36	.68	-.57	.49	.40	.23	-.56	4.02	1.40	22
-.69	-.70	-.73	-.55	-.32	-.62	-.53	-.64	-.37	-.60	.73	-.32	-.50	.02	.68	16	18	22
-.62	-.70	-.70	-.74	-.48	-.74	-.71	-.74	-.33	-.65	.30	-.45	.33	.34	.41	63	42	22
-.68	-.38	-.60	-.43	-.11	-.49	-.37	-.58	-.12	-.62	.51	-.32	-.43	-.50	.41	25	33	22
-.61	-.42	-.54	-.55	-.34	-.56	-.53	-.57	-.25	-.37	.38	-.23	-.58	.06	.53	28	29	22
-.27	-.45	-.56	-.43	-.40	-.38	-.44	-.39	-.29	-.15	.36	-.01	-.20	.19	.39	49	45	22
.77	.77	.81	.73	.54	.77	.73	.81	.48	.68	-.82	.36	.55	.03	.74	3.61	.82	22
	.82	.94	.90	.52	.89	.85	.93	.43	.79	-.58	.68	.75	.52	-.80	21.19	4.15	23
		.96	.82	.66	.83	.82	.92	.38	.56	-.65	.56	.54	.30	-.69	24.31	5.82	24
			.89	.60	.88	.86	.97	.34	.68	-.66	.61	.63	.39	-.75	45.95	9.38	23
				.74	.97	.97	.96	.49	.71	-.54	.58	.67	.44	-.74	21.36	3.67	24
					.76	.87	.74	.34	.42	-.57	.36	.45	.22	-.58	13.90	2.76	24
						.97	.96	.55	.74	-.63	.60	.71	.43	-.75	13.74	2.84	24
							.96	.50	.68	-.63	.55	.64	.39	-.74	49.07	3.78	24
								.37	.71	-.67	.57	.63	.39	-.76	96.07	17.13	23
									.51	-.19	.37	.35	.31	-.29	19.64	21.38	24
										-.47	.61	.55	.52	-.55	19.64	3.02	24
											-.36	-.56	-.24	.74	14.03	6.11	22
											.74	.74	.76	-.71	10.67	1.44	21
													.57	-.89	2.52	1.03	21
														-.50	18.28	1.87	21
															-.84	4.61	24

Note: This is a pairwise matrix, based on 21-24 projects.

*Dichotomous variable.

TABLE G.4b. Intercorrelations among project means and percentages on selected variables: Grade 3

Variable	CORRELATIO													
	A. Mean hrs./wk.							B. Math: Hrs. in Eng.	C. Langs. used or taught (%)					D. Major
	1	2	3	4	5	6	7		1	2*	3	4	5*	
A. Mean hrs./wk.														
1. Reg. Eng:Rdg		-.34	.75	-.23	.28	.08	.23	.22	-.08	-.20	-.04	-.13	-.15	.18
2. Spec. Eng (except oral)			-.06	.90	.64	.31	.36	.17	.17	.81	.13	.27	.44	-.39
3. Reg Eng Total				.09	.66	.30	.53	.36	.14	.13	.26	-.02	.16	-.08
4. Spec. Eng Total					.81	.44	.26	-.10	.44	.89	.37	.52	.44	-.55
5. Eng Total (Reg & Spec)						.51	.51	.14	.42	.75	.43	.39	.43	-.46
6. Indian language							.23	-.04	.43	.30	.14	.40	.60	-.33
7. Math								.85	-.12	.33	.05	-.06	.30	.02
B. Math:Hrs./wk. in Eng.									-.55	-.00	-.31	-.63	.05	.38
C. Languages used or taught														
1. MSS: % in Indian lang.										.41	.65	.64	.55	-.87
2.% receiving Spec. instruction in Eng.*											.49	.50	.46	-.64
3. MSS: % in simplified Eng.												.45	.28	-.69
4. Eng.: % in simplified Eng.													.37	-.47
5. % taught Indian lang.*														-.58
D. Major Cluster														
E. Stanford Ach. Test (Prim 3, form F)														
1. English														
a. Vocab														
b. Reading Comp.														
c. Total														
2. Math														
a. Concepts of No.														
b. Comput.														
c. Applics.														
d. Total														
3. Eng. + Math														
a. Total														
F. Raven Total (SPM)														
G. SOPR														
1. Indian language SPOR														
2. English SOPR														
H. Home and family														
1. Parents' Ed. - B														
2. Parents' use of Eng in home - A														
3. Socioeconomic Statu														
I. Community Use of Ind. lang.														

TABLE G.4b. (Continued)

C O E F F I C I E N T S																	
E. Stanford Ach. Test (Prim. 3 form f)								F.	G. SOPR		H. Home & Family			I.			
1. English			2. Math				3. Eng + Math							Comm. Use of Ind. Lang.			
a	b	c	a	b	c	d		Raven	1	2	1	2	3		Mean	σ	N
										*							
.17	.27	.24	.06	.18	.19	.17	.21	-.24	-.05	-.27	-.11	-.14	.06	-.06	4.96	2.12	23
-.36	-.29	-.32	-.25	-.23	-.27	-.26	-.29	.15	-.32	.19	.07	.03	-.34	.06	1.69	2.21	23
-.10	-.02	-.04	-.14	.02	-.04	-.05	-.04	-.39	-.39	-.09	-.34	-.27	-.10	.08	8.71	2.99	23
-.54	-.55	-.56	-.47	-.34	-.51	-.46	-.51	-.12	-.58	.29	-.09	-.27	-.36	.31	3.28	3.80	23
-.47	-.42	-.45	-.44	-.25	-.41	-.37	-.41	-.32	-.67	.17	-.28	-.37	-.34	.28	12.00	5.04	23
-.27	-.30	-.29	-.25	-.17	-.31	-.25	-.27	-.23	-.34	.46	-.06	-.45	-.26	.34	1.89	2.72	23
-.15	.03	-.03	.05	.02	.03	.03	.01	-.04	-.08	.13	.02	.11	-.03	-.04	4.98	1.17	23
.22	.40	.36	.31	.21	.35	.31	.35	.21	.28	-.19	.14	.45	.07	-.41	4.5	1.19	23
-.57	-.66	-.66	-.56	-.38	-.64	-.56	-.63	-.34	-.58	.60	-.15	-.67	-.03	.67	13	.15	23
-.57	-.46	-.52	-.39	-.28	-.39	-.38	-.45	-.01	-.56	.33	-.06	-.26	-.18	.30	51	.42	23
-.71	-.61	-.67	-.50	-.32	-.48	-.47	-.58	-.35	-.72	-.56	-.46	-.76	-.19	.67	19	.27	23
-.57	-.65	-.64	-.48	-.39	-.62	-.55	-.61	-.37	-.42	.40	.14	-.62	-.15	.50	17	.24	23
-.39	-.32	-.35	-.24	-.29	-.31	-.31	-.33	-.01	-.12	.57	-.08	-.36	-.24	.30	49	44	23
.61	.58	.62	.50	.30	.53	.47	.56	.07	.65	-.65	.23	.55	-.01	-.65	3.83	.97	23
	.85	.95	.80	.76	.76	.83	.91	.41	.67	-.56	.45	.62	.38	-.64	16.64	4.13	23
		.97	.85	.66	.94	.87	.94	.63	.69	-.32	.45	.61	.37	-.58	30.49	6.34	23
			.85	.73	.90	.88	.97	.55	.71	-.45	.47	.64	.39	-.64	46.98	10.08	23
				.82	.89	.96	.94	.59	.61	-.16	.40	.49	.37	-.44	18.08	3.26	23
					.70	.91	.85	.33	.35	-.26	.33	.40	.46	-.36	22.05	4.55	23
						.92	.93	.55	.62	-.25	.36	.58	.29	-.54	17.56	3.93	23
							.97	.52	.55	-.25	.37	.52	.39	-.47	57.52	11.11	23
								.55	.64	-.36	.42	.59	.40	-.57	104.25	20.46	23
									.38	.14	.34	.40	.38	-.19	27.70	3.57	23
										-.30	.52	.64	.19	-.59	21.14	2.26	23
											-.13	-.65	-.10	.78	14.79	5.98	21
												.45	.50	-.45	10.71	1.52	21
													.33	-.90	2.69	1.05	21
														-.24	18.65	1.90	21
															-1.00	4.64	23

NOTE: This is a pairwise matrix based on 21-23 projects.

*Dichotomous variable.

TABLE C.5a. Project-level and student-level intercorrelations among selected variables: Grade 1

		CORRELATION COEFFICIENTS																		
		A.Mean hrs./wk.			B. Stanford Ach. Test								C	D	E. Family			Mean	σ	N*
					1.Eng			2. Math				Tot		Eng						
Variable	Level	1	2	3	1a	1b	1c	2a	2b	2c	2d	3	Raven	SOPR	1	2	3			
A.Mean Hrs./Wk.																				
1. Reg Eng:Rdg	Project		.10	.66	.20	.30	.26	.08	-.19	.10	.00	.13	-.03	.15	.02	.15	-.06	6.32	3.13	22
	Student		.03	.44	.08	.07	.08	.02	-.10	.07	-.01	-.04	-.03	.04	-.10	-.01	-.06	6.18	3.90	542
2. Spec.Eng.(except oral)	Project			-.07	-.42	-.33	-.33	-.52	-.28	-.52	-.48	-.38	-.45	-.44	-.41	-.34	-.61	1.29	1.63	22
	Student			.16	-.21	-.18	-.21	-.18	-.05	-.20	-.16	-.20	-.07	-.15	-.26	-.06	-.11	1.30	2.01	542
3. Math	Project				.57	.50	.54	.36	.17	.43	.34	.44	.27	.61	.33	.52	.21	4.40	1.07	22
	Student				.20	.12	.17	.07	.03	.12	.08	.14	-.06	.26	.12	.14	.04	4.24	1.33	542
B.Stanford Achievement Test (Primary 1 Form F)																				
1. English																				
a. Vocab	Project					.82	.94	.90	.52	.89	.85	.93	.43	.79	.75	.68	-.80	21.19	4.15	23
	Student					.60	.85	.64	.39	.62	.63	.80	.29	.57	.39	.22	.25	19.93	6.03	542
b. Rdg Comp	Project						.96	.82	.66	.83	.82	.92	.38	.56	.54	.56	.30	24.31	5.82	24
	Student						.93	.59	.48	.55	.62	.84	.28	.43	.20	.11	.12	23.98	8.51	542
c. Total	Project							.89	.60	.89	.86	.97	.34	.68	.63	.61	.39	45.95	9.38	23
	Student							.67	.49	.65	.69	.92	.31	.54	.31	.17	.20	43.91	13.06	542
2. Math																				
a. Concepts of no.	Project								.74	.97	.97	.96	.49	.71	.67	.58	.44	21.36	3.67	24
	Student								.62	.77	.92	.87	.40	.52	.23	.11	.10	20.84	5.85	542
b. Comput.	Project									.76	.87	.74	.34	.42	.45	.36	.22	13.90	2.76	24
	Student									.57	.83	.72	.31	.37	.19	.10	.15	14.26	4.94	542
c. Applic.	Project										.97	.96	.55	.74	.71	.60	.43	13.74	2.84	24
	Student										.87	.83	.40	.54	.28	.09	.10	13.46	4.24	542
d. Total	Project											.96	.50	.68	.64	.55	.39	49.07	8.78	24
	Student											.92	.42	.54	.26	.11	.13	48.57	13.20	542
3. Eng + Math Total	Project												.37	.71	.63	.57	.39	96.07	17.13	23
	Student												.40	.59	.30	.15	.17	92.49	24.15	542
C.Raven Total (CPM)	Project													.51	.35	.37	.31	19.64	2.38	24
	Student													.23	-.01	.03	.03	20.08	5.48	542
D.Eng.SOPR Total	Project														.55	.60	.52	19.64	3.02	24
	Student														.36	.25	.27	19.51	4.55	542
E.Home and family																				
1. Use of Eng.by parents	Project															.74	.57	2.53	1.03	21
	Student															.25	.36	2.36	1.34	299
2. Parents' ed - B	Project																.76	10.67	1.44	21
	Student																.78	10.72	3.25	297
3. Socioec.status - A	Project																	18.28	1.87	21
	Student																	18.16	4.52	223

*The project matrix is pairwise; the student matrix is partly listwise (variables in categories A-D) and partly pairwise (variables in category E: home-and-family).

TABLE G.5b. Project-level and student-level intercorrelations among selected variables: Grade 3

Variable	Level	CORRELATION COEFFICIENTS																Mean	σ	N*
		A.Mean hrs./wk.			B. Stanford Ach. Test								C	D Eng	E. Family					
					1.Eng			2. Math				Tot								
		1	2	3	1a	1b	1c	2a	2b	2c	2d	3	Raven	SOPR	1	2	3			
A.Mean hrs./Wk.																				
1. Reg. Eng:Rdg.	Project		-.34	.23	.17	.27	.24	.06	.18	.19	.17	.21	-.24	-.05	-.14	-.11	-.06	4.98	2.12	23
	Student		.00	.44	.11	.05	.08	.01	.02	.03	.03	.05	-.14	-.05	-.09	.11	.08	5.26	2.67	419
2. Spec.Eng. (except oral)	Project			.36	-.36	-.29	-.32	-.25	-.23	-.27	-.26	-.29	.15	-.32	.02	.07	-.34	1.69	2.21	23
	Student			.24	-.15	-.05	-.09	-.16	-.12	-.06	-.13	-.12	.02	-.14	.09	.06	-.13	1.58	2.33	419
3. Math	Project				-.15	.03	-.03	.05	.02	.03	.03	.01	-.04	-.08	.11	.02	-.03	4.98	1.17	23
	Student				-.01	.01	.00	.07	.02	.00	.03	.02	-.01	-.11	.12	.06	.09	4.91	1.64	419
B.Stanford Achievement Test (Primary 3 Form F)																				
1. English																				
a. Vocab	Project					.85	.95	.80	.76	.76	.83	.91	.41	.67	.62	.45	.38	16.64	4.13	23
	Student					.63	.83	.56	.41	.57	.58	.75	.30	.41	.32	.28	.29	15.84	6.07	419
b. Rdg.Comp	Project						.97	.85	.66	.94	.87	.94	.63	.69	.61	.45	.37	30.49	6.34	23
	Student						.95	.52	.55	.70	.67	.87	.42	.46	.27	.23	.20	29.30	11.35	419
c. Total	Project							.85	.73	.90	.88	.97	.55	.71	.64	.47	.39	46.98	10.08	23
	Student							.58	.55	.72	.70	.91	.41	.49	.31	.27	.25	45.14	15.87	419
2. Math																				
a. Concepts of no.	Project								.82	.89	.96	.94	.59	.61	.49	.40	.37	18.01	3.26	23
	Student								.66	.67	.87	.80	.47	.36	.18	.25	.26	17.82	6.23	419
b. Comput.	Project									.70	.91	.85	.33	.35	.40	.33	.46	22.05	4.55	23
	Student									.60	.88	.79	.37	.32	.12	.22	.23	22.75	8.57	419
c. Applic.	Project										.92	.93	.55	.62	.58	.36	.29	17.56	3.93	23
	Student										.86	.86	.48	.39	.18	.23	.20	17.10	7.32	419
d. Total	Project											.97	.52	.55	.52	.37	.39	57.72	11.11	23
	Student											.94	.50	.41	.18	.26	.26	57.68	19.30	419
3. Eng + Math Total	Project												.55	.64	.59	.42	.40	104.25	20.46	23
	Student												.50	.48	.26	.29	.28	102.81	32.49	419
C.Raven Total (SPM)	Project													.38	.40	.34	.38	27.70	3.57	23
	Student													.23	.18	.19	.18	27.30	8.11	419
D.Eng.SOPR Total	Project														.64	.52	.19	21.14	2.26	23
	Student														.31	.23	.28	20.35	3.87	419
E.Home and family																				
1. Use of Eng.by parents	Project															.45	.33	2.69	1.05	21
	Student															.29	.31	2.47	1.27	284
2. Parents' ed. - B	Project																.50	10.71	1.52	21
	Student																.82	10.36	3.51	282
3. Socioec.status - A	Project																	18.65	1.90	21
	Student																	18.41	4.62	189

*The project matrix is pairwise; the student matrix is partly listwise (variables in categories A-D) and partly pairwise (variables in category E: home-and-family).

Appendix H: TECHNICAL ADVISORY PANEL MEMBERS

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